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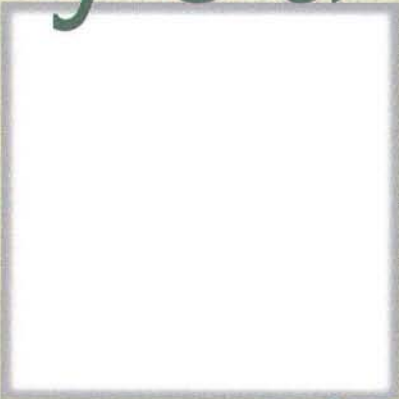
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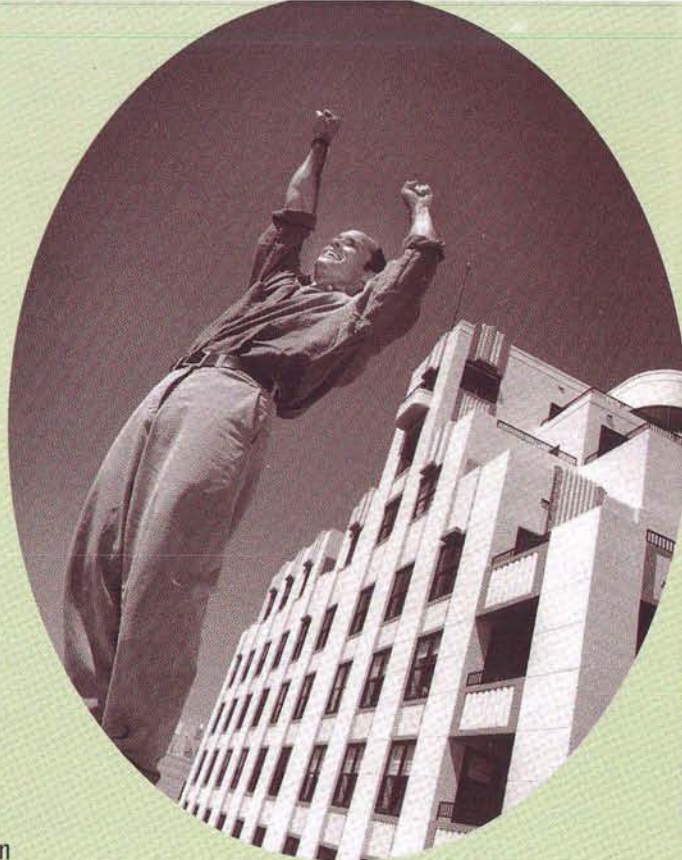
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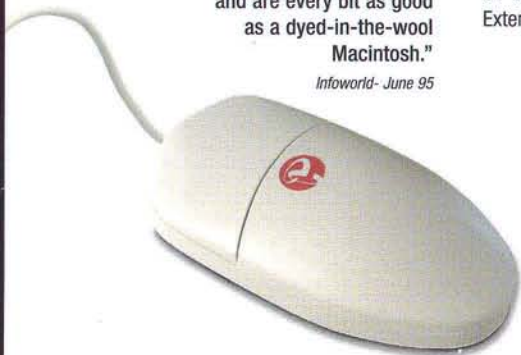
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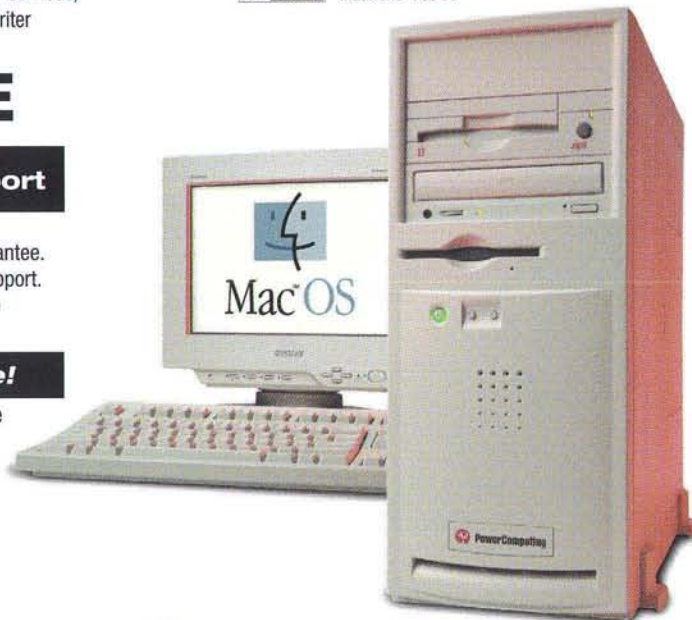
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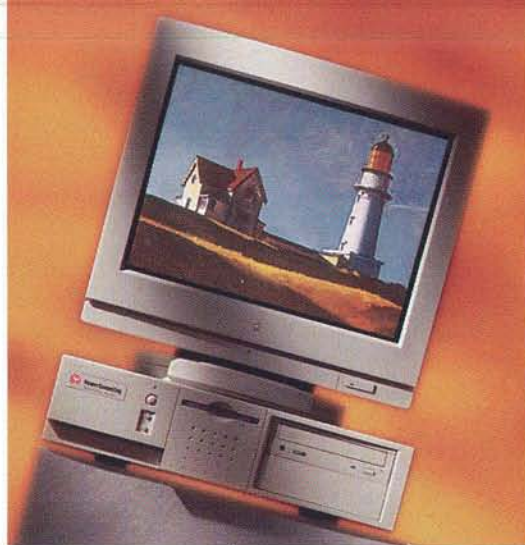
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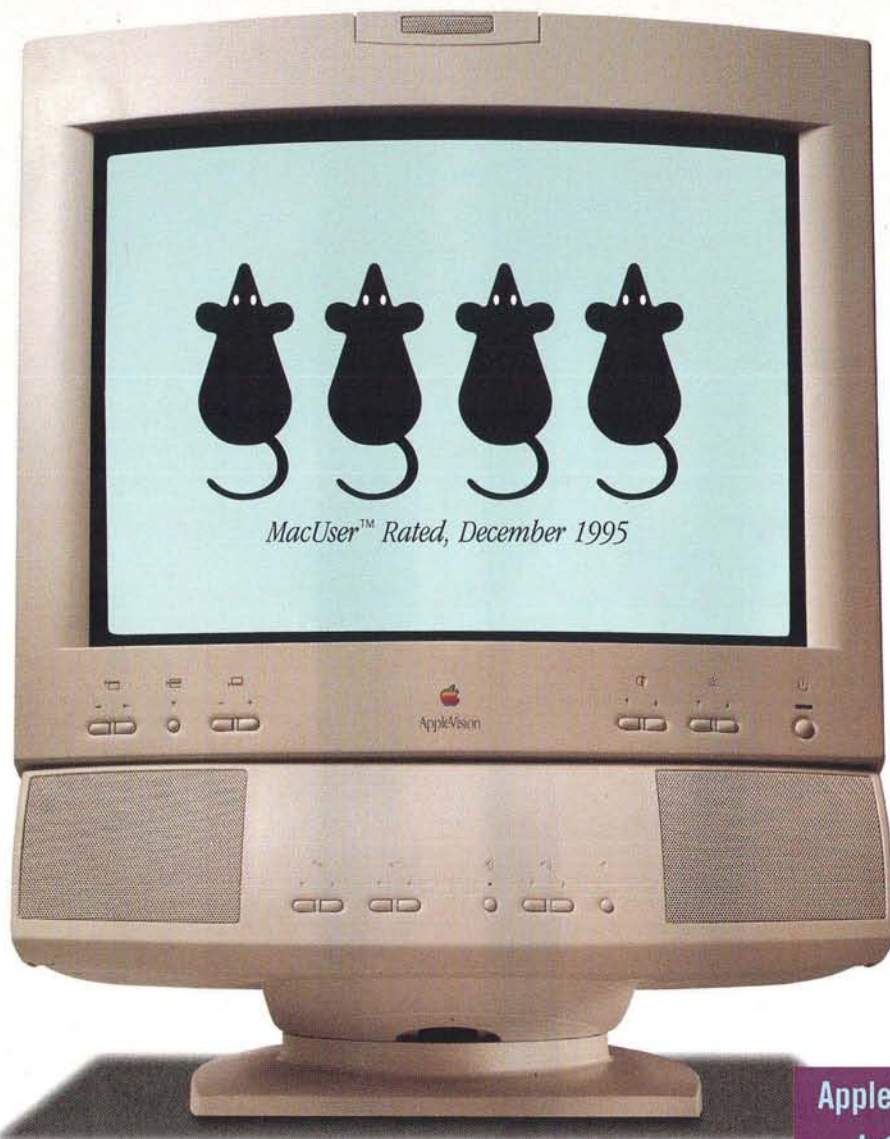


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Mapping software
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Font utility

When it comes to rating multimedia monitors,



AppleVision® 1710AV

\$1159*

MacUser magazine recently put some of the leading multimedia monitors through their paces. They performed lab tests on image and sound quality. They stared at test documents, line art and scanned images. They played their favorite CD's at various levels. They fiddled with knobs and on-screen

controls. And they researched street prices and warranties. After all the results were in, the ViewSonic 17GA 17" (16.0" viewable) PerfectSound™ multimedia monitor was singled out as the "Best Buy." No wonder. An entirely new technology creates the ultimate screen image – maximum

resolution of 1,280 x 1,024, refresh rates as high as 160Hz, and razor sharp screen definition.

And listen to this. High fidelity speakers are integrated into the monitor bezel so the full, rich stereo sound envelopes you. To quote a satisfied customer, "It rocks, man!"



And the 17GA is so attractively priced, it's like getting the multimedia feature for free. Several competitive models cost as much but are not even multimedia monitors. Rather than toot our own horn, perhaps we should refer you to MacUser magazine:

mice are nice but checks are better.



ViewSonic® 17GA
\$850*

"A real multimedia bargain," they said, "the ViewSonic 17GA offers solid image quality, warm colors, fine-sounding audio and a slew of easy-to-use on-screen controls." So when you're ready to buy, remember this: Many 17" (various viewable) multi-media monitors come

+ / OUTSTANDING		• / ACCEPTABLE		- / POOR	
RATING	PRODUCT	PRICE	SUPPORT	IMAGE QUALITY	SOUND QUALITY
★★★★	ViewSonic 17GA	•	•	+	•
★★★★	Apple Apple Vision 1710AV	-	•	+	+
★★★★	IBM 17S/S	-	•	•	+
★★★★	Nokia 447W	•	•	+	-
★★★★	Panasonic Pana Media 17	•	+	•	•
★★★★	Philips 17B	•	•	•	-
★★★★	Philips Brilliance 15A	•	•	•	-

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with mice, but only the ViewSonic 17GA has been selected as MacUser magazine's "Best Buy."



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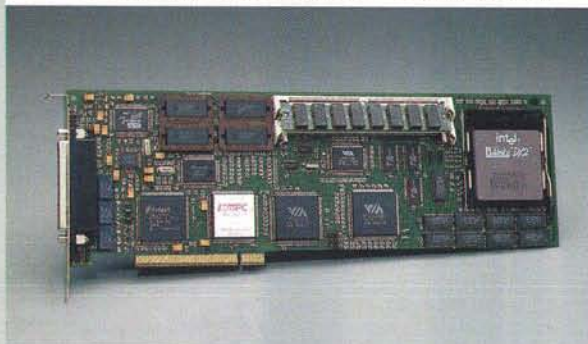
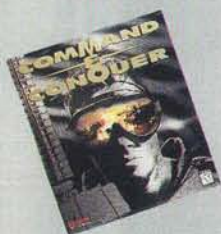
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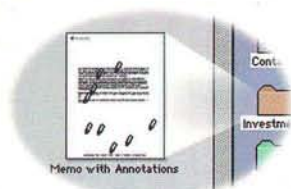
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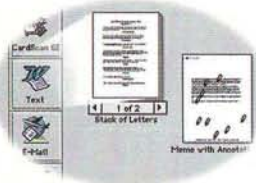
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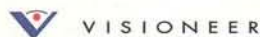
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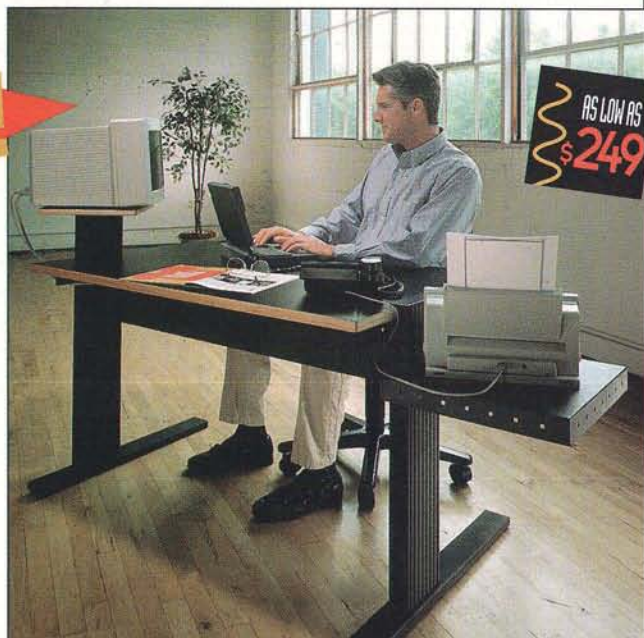


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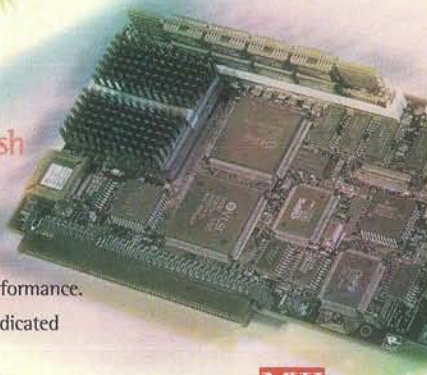
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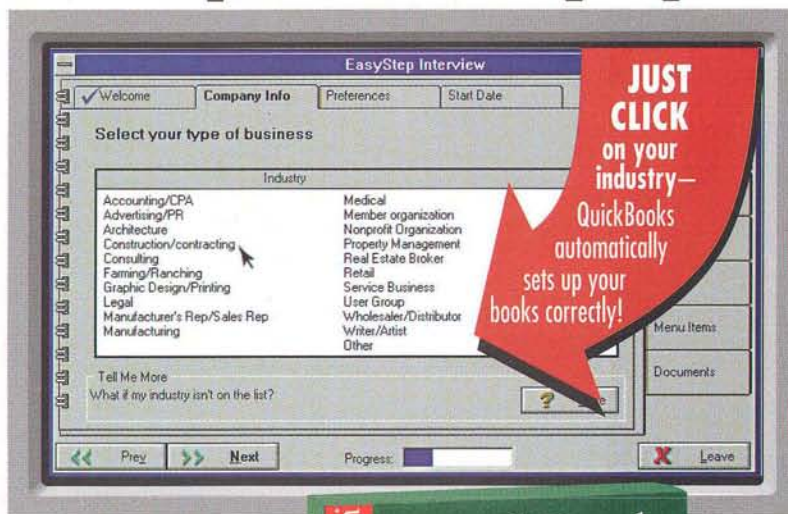
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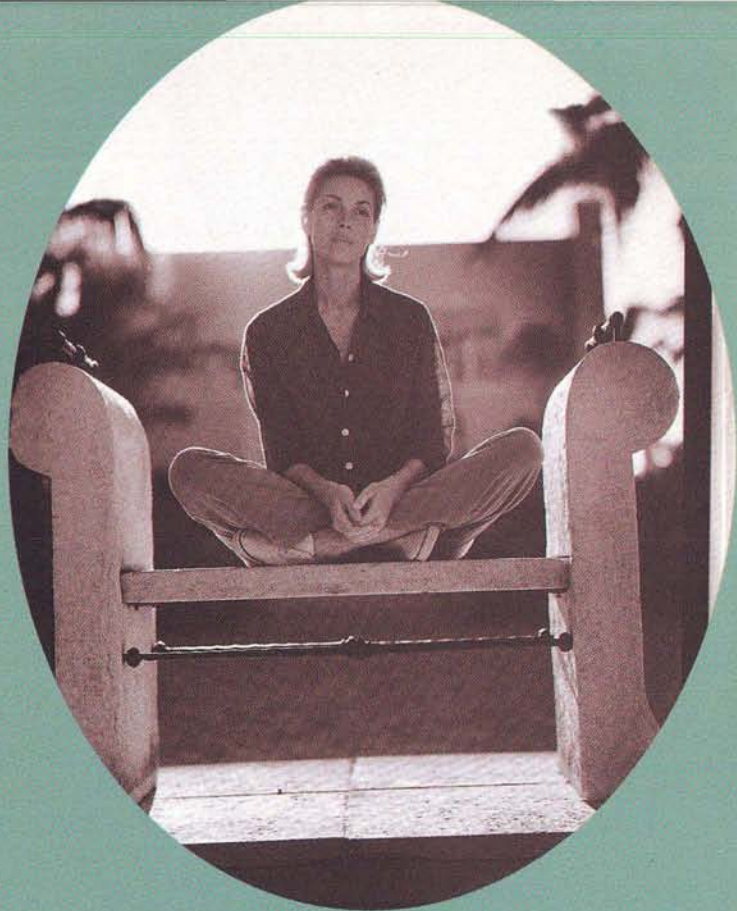
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Letters

A Note on Copland

I RECENTLY PURCHASED A DAYSTAR PowerPro 601 upgrade for my Mac Centris 650. I am very pleased with its performance, but I was surprised and shocked to read in "Why Apple Can't Meet Demand" (January 1996) that Copland will not support PowerPC accelerator cards. When I called Apple, the technical representative I spoke with claimed to know nothing about this. Greg Erickson, the DayStar rep who answered my E-mail inquiry, responded promptly but didn't shed much light on the issue. His statement:

"The article did state that Copland will require controller chips found on Power Mac computers but not PowerPC upgrade cards. However, Copland will not be available for at least a year and feature sets and operating requirements are subject to change. Apple, too, has a lot of PowerPC upgrade cards in the field. It is certainly in their interest to broaden the list of supported Macs!"

I'm writing to ask if *Macworld* could publish more details on this important issue. There must be many users of PowerPC-upgraded Macs who don't want to be excluded from enjoying the benefits of Copland.

GARY SHACKELFORD
via the Internet

According to Apple's OS technologies department, Copland will not run on PowerPC-upgraded 680X0 Macs or 500-series PowerBooks, whether the upgrade cards were purchased from Apple or DayStar. Apple will introduce a 680X0 version of some Copland technologies, such as the interface, but that solution will not support true multitasking and multithreading, as Copland will.

Duo 200 owners who opt for the PowerPC upgrade will be able to take full advantage



of Copland, since the PowerPC upgrade will replace the entire motherboard.—Ed.

Game Point

AS THE FLIGHT SIMULATORS I USE become more complicated, I find I need a reminder for which keys do what. So I designed a series of overlays in Adobe's PDF format for several games: A-10 Attack, A-10 Weapons Loadout Chart, Chuck Yeager's Air Combat, Dogfight City, Falcon, Flight Simulator 4, Hellcats and Leyte Gulf, and F/A-18 Hornet.

They're all available on my home page (<http://www.fairmont.wvnet.edu/www/webteam/bob/overlays/overlays.html>) and should print easily on just about any printer. PDF files require Acrobat Reader to view or print out, so I also have a link to Adobe's Web page.

BOB HEFFNER
via the Internet

IN HIS REVIEW OF DOMARK SOFTWARE'S *Out of the Sun* (January 1996), Mel Beckman waxed enthusiastic about the game's historical accuracy. I am wary of his enthusiasm, though, because according to the graphic accompanying the review, the people at Domark Software (and evidently Mel) don't know that the B-25 Mitchell was a product of North American Aviation, not Martin Aircraft. Martin Aircraft produced the B-26 Marauder, another twin-engine medium bomber of the era.

GARY K. MCCORMICK
San Jose, California

Ouch! We stand corrected.—Ed.

AS ALWAYS, I ENJOY YOUR MAGAZINE for all the information it provides, both fun and business-related. I am still only part way through the January issue, but I thought you might want to know about a game site you did not mention in "Game On" (*Macworld Online*, January 1996). Why pay \$9.95 per month to Outland, fanatic backgammon players, when you can play for free via FIBS (First Internet Backgammon Server)? The interface is a little bare, and the screen constantly scrolls as players log in and out, start and finish games and matches, and so on, but I have found it addicting enough to make do. For those of us who are not into supergraphic, joystick-slammin' action stuff, it is a blast. I have played against folks in Germany, Italy, and Greece, as well as throughout the United States. If only I could find some interested flesh-and-blood types to start a local club, maybe I could get off FIBS and get back to work!

ADAM TYSON
via the Internet

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Circle 4 on reader service card

LETTERS

CORRECTIONS

- The Performa 6300 does not come with a second serial port or an MPEG video-playback card as stated in January's New Products—Apple's plans changed after our issue went to press.
- The correct phone number for Creative Solutions is 410/766-4080 ("New Products," News, February 1996).
- The correct price for Meadow Information Systems' AutoPrice is \$1895 ("New Products," News, February 1996).

Searching for backgammon on the World Wide Web reveals a number of tasty-looking sites. Or you fanatical backgammon players can just Telnet directly to FIBS at fraggel65.mdstud.chalmers.sc:4321 and log in as a guest, then type **help** for an introduction to FIBS. If the command-line interface distresses you too much, download Paul Ferguson's MacFIBS 2.0.3 graphical front end from <ftp://ftp.best.com/pub/fergy>.—Ed.

QuickTake Retake

IN YOUR DIGITAL CAMERAS REVIEW (January 1996), Deke McClelland says, "You should avoid quarter-screen photos—one image contains 77,000 pixels, less than half the number used to print the yellow *F* at the beginning of this article." That may be true if the *F* Deke was referring to was printed on a 600-dpi printer. At screen resolution, it would have taken up, at most, 1024 pixels—the same size as an icon (32 by 32 pixels). And a 320 by 240 "quarter-screen" image is a lot bigger, at screen resolution, than an icon.

SIMON RINGSMUTH
via the Internet

That yellow *F*, as printed in the magazine, measured 15 points tall by 12 wide, and was printed at 2400 dpi. As a result, it contained around 200,000 pixels, more than 250 percent as many as a quarter-screen image. Quarter-screen images are far too small for printing purposes; even if you don't notice the graininess, jagged edges, and soft focus that comes with low resolution, you can rest assured some of your readers will. Quarter-screen digital-camera pictures are also ill-suited to screen display, since the compression is more obvious on screen than it is in print. If you shoot your pictures at maximum resolution and resample them down by 50 percent, the compression becomes almost invisible.—Ed.

Why I Love Apple

WITH THE HIGH-PRESSURE TV COMmercials and magazine blitzes currently going on between Macintosh and Microsoft's Windows 95, I found this simple diagram on ease of use to be the Last Word! I recently received my free copy of The Merchant: Hassle-free Shopping on CD-ROM. When I opened the packaging, I found the following instructions quite humorous.

How do I get started?

For Windows Users:

1. From the Program Manager, choose Run from the file menu. 2. In the Command Line box, type **D:\INSTALL** (where D is the letter assigned to your CD-ROM drive), and click OK. To run The Merchant, double-click The Merchant icon. Start shopping!

For Windows 95 Users:

Windows should start The Merchant automatically. The first time it is run, click on Install The Merchant. If Windows does not start the program automatically:

1. Choose Run from the Start menu. 2. In the Open box, type **D:\INSTALL** (where D is the letter assigned to your CD-ROM drive), and click OK. Then, to run The Merchant, select Start The Merchant when the CD-ROM is first inserted, or from the Start menu select Programs>Merchant For Men>The Merchant. Start shopping!

For Mac Users:

Double-click The Merchant icon. Start shopping!

LYNN CHAMBERS
Brewton, Alabama

Kiosk Hall of Shame

THE DAY I GOT THE JANUARY 1996 ISSUE of Macworld, I had just returned from the Rock and Roll Hall of Fame and Museum. The first display of kiosks I encountered, to the left on the ground floor, were sluggish and temperamental; the five on the right simply gave up and shut down a few minutes after we got there. The server would flash error messages, which the software would cover up, and then the application would quit. To

continues

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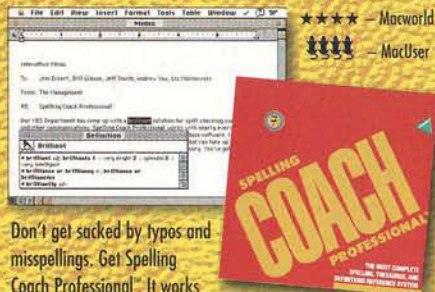
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LETTERS

make things worse, I got a brief glimpse of Apple's At Ease running underneath. The frame rates were impressive, as you said ("Finally, Rock Computes," *Networks* news, January 1996), but the kiosks themselves broke down far too often.

But it gets worse. After taking two or three hours to browse the museum, I was really looking forward to seeing the Hall of Fame itself on the darkened sixth floor. I climbed the spiral staircase and entered the blackness to face the monochrome, LCD screen of a PC, with "Please wait, ROM BIOS is booting up" on the screen.

The singing rocks in front of the museum captured my attention longer than either of these two attempts at multimedia.

THOMAS MICHAEL BROOKS
via the Internet

The Quadra 630 Question

I AM LOOKING FOR A DOS CARD FOR MY Quadra 630. I checked with Reply and they said Apple provides this solution. I called Apple and was told to check with Reply. What's the deal? Do you know who is making the DOS card? I'd appreciate any information about who is making a DOS card and if it can be purchased.

JACKIE MCCARTNEY
via the Internet

You've been led on a wild goose chase, I'm afraid. Neither Apple nor Reply—nor any other third-party vendor for that matter—makes a DOS card for the Quadra 630 because of its LC III-style PDS slot. Owners of a Performa/LC 470-series, 550-series, or 570-series Mac are in the same predicament. Your only option is a software solution like Insignia Solutions' SoftWindows 1.0 (2.0 won't run on 680X0 Macs) or Farallon Computing's Timbuktu.—Ed.

AFTER READING *NEW PRODUCTS* (January 1996), I called Apple to get a release date on the Quadra 630-to-Performa 6300 upgrade. The guy I spoke to at Apple said it didn't exist and eluded my attempts to get information on this or any future upgrades. But he did slam *Macworld* for printing the announcement. What's up with these guys? Do you know the truth about this on-again, off-again upgrade?

BOB OLSON
via the Internet

Sometimes customer service is the last to know. The motherboard upgrade to take a Per-

forma/Quadra 630, 5200, and 6200 to a 100MHz PowerPC Performa 6300 was expected to begin shipping in January.—Ed.

Join One, Join All

REGARDING YOUR *CONSPICUOUS Consumer* column in the January 1996 issue, I disagree that users are better off joining a local user group instead of one of the national giants—BMUG and BCS•Mac in particular.

While it's true that the local groups offer more to people in their immediate geographical areas, national ones still offer *all* users information opportunities beyond those any local group could hope to offer. BMUG's excellent BBS is on the Internet; through using it, I've been able to avoid ever calling for commercial technical help. Its help lines are available by phone. It maintains an enormous shareware library, creates its own CD-ROMS, and sells both its own and other computer books at a discount. Finally, its formidable newsletter is a powerful influence on the computer industry.

It's not either/or; both large and local user groups have something to offer anyone.

BETSY RAMBERG
via the Internet

CAPrice

IN RESPONSE TO THE LETTER ADMON-ishing Guy Kawasaki for his criticism of those who type E-mail in all caps (*Letters*, January 1996), I offer the following: dearsir:iamsorrythatyoudisagreewithguykawasakisremarksaboutfolkshotypeinallcaps.however,youexcuseofsavingyourselffromcarpaltunnelsyndromeis ludicrous.isavedawholelotofkeystrokesinthismessage,butitsureishardtoread!

CHARLES REEVES, JR.
via the Internet

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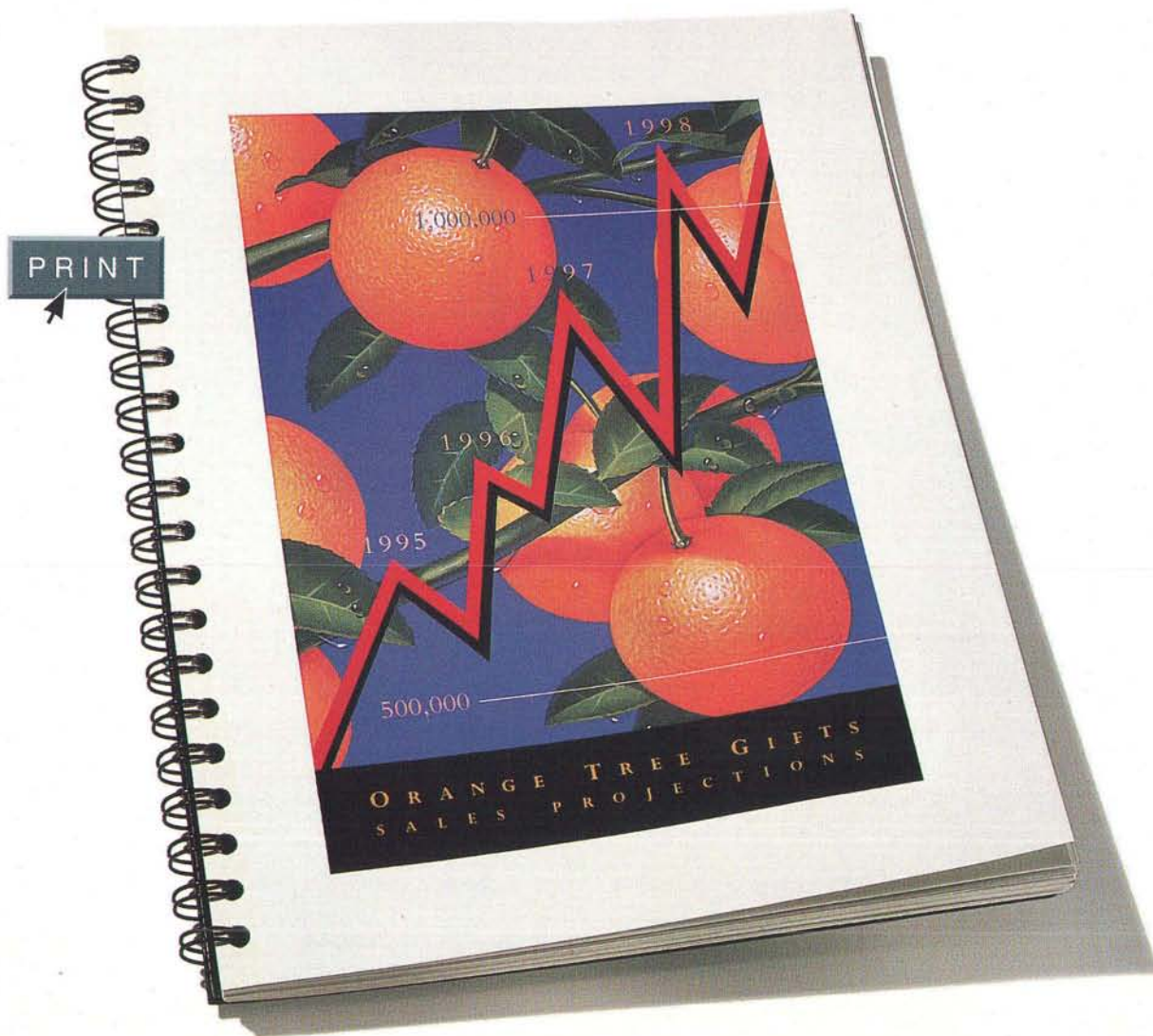
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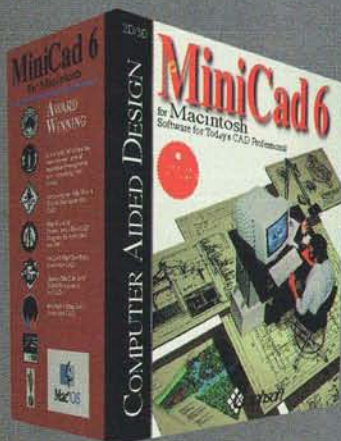
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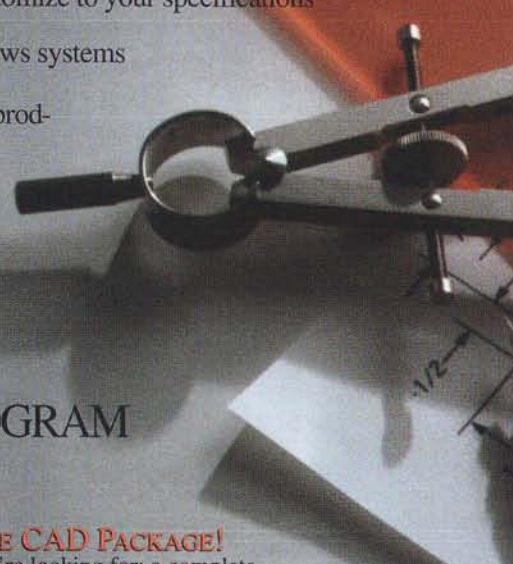
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Circle 46 on reader service card



State of the Mac

by Adrian Mello

Apple Leadership: Chain of Fools

APPLE'S INEPT CHIEFS ARE DISCONNECTED FROM REALITY

PUT AWAY THE BLACK veils. Forget the operatic media pundits predicting Apple's imminent implosion. Apple is a strong business with tremendous assets, and the Mac isn't going to die anytime soon, if ever. Beyond the hype, though, the company must make fundamental changes in the way it does business. Because Apple has not been successful in solving its problems, I've developed an action plan for a new board of directors, a would-be buyer, or even the current leadership.

Apple's real problems have little to do with products or balance sheets; Apple's real problems stem from the epic levels of incompetence and indecision displayed by a core of inept leadership and bloated layers of self-serving managers. The Mac is an unbelievably great computer. Apple is an unbelievably rugged company. Apple's leadership is just plain unbelievable.

Let me make this very clear: Apple must *act*. Empty press releases, feel-good advertisements like those it ran in the *New York Times*, and speeches that repackage old dogma don't solve anything. Such transparent moves are particularly damaging now that Apple's management has once again proven itself so willing to dodge, rather than solve, crucial issues.

Make Up Your Mind

Apple's biggest problem is that it is spread too thin. Years of greed have saddled the company with the dual burden of driving the Mac Operating System forward *and* selling enough computers to maintain the Mac's market share. There's a joke that illustrates Apple's unrealistic ambitions: What company does Apple think it's most like—Microsoft, IBM, or Novell? Answer: All of the above.

Apple must decide what its fundamental business is. The sheer breadth of Apple's endeavors prevents it from focus-

ing its efforts. Apple must develop leadership and discipline: it must both play hard in businesses where it can make money, and learn how and when to stay the course with developing technologies.

Further, by insisting on having all the markets all to itself, Apple has steadily alienated potential strategic partners. Rather than acting like a selfish child, clutching its toys to its breast, Apple must learn to work and play with others.

Apple should maintain a portfolio of businesses, but each discrete unit should be organized and scaled in a way that makes sense. Within Apple, Claris is a good example of this. Claris is treated as a truly separate division; it remains focused on being a successful software

Build Premium Products

Apple should focus on selling better-outfitted, better-quality Macs and leave low-cost, low-profit Macs to manufacturers set up to fight price wars. When Apple tries to compete solely on price, its margins aren't high enough to cover its research and development costs and remain profitable. However, Apple has shown time and time again that it can make better, more interesting products than other computer makers, and sell those products at a premium.

But Apple cannot just hike up the prices and ignore offering competitive values as it did several years ago. Neither should it abandon the home and education markets. Doing so would only damage the Mac's presence in these markets, which is not in Apple's long-term interests.

Of course, Apple's focusing on premium computers requires that there be a strong clone presence to maintain the Mac market's critical mass. Which leads to . . .

Let Clones Happen

Apple absolutely, without fail, must become serious about licensing the Mac OS. Not licensing the Mac OS early enough is the company's worst strategic mistake of all time, and its continued failure to license broadly only perpetuates this bad situation. Since

announcing licensing plans in late 1994, Apple has effectively turned away every major computer company that has shown interest.

Apple's current halfhearted licensing measures are nearly worthless. It will take a number of large-scale computer manufacturers to establish broad support for the Mac platform and grow its market share, and it's unlikely that major com-

continues



pany and is doing quite well. Apple should cut loose projects and divisions that aren't central to the company's core vision, and work toward organizing other key parts of its business—computers, imaging hardware, Newton, and eventually, system software—as separate divisions. The result will be a set of linked enterprises that are better motivated, more effective, more decisive, and more accountable for their decisions.

puter companies will license the Mac OS if they can only make low-cost Macs. They will want to compete with full product lines, enabling them to make better margins on their own premium computers. Apple must show that it is willing to enter into this kind of an agreement with a large-scale manufacturing company.

Leverage Your Assets

Apple's best competitive asset is software expertise, but its revenues are almost

completely dependent on hardware sales. In the long run, Apple needs to make a larger percentage of its revenues off its software business.

As soon as possible, the system software group must be organized as a stand-alone division whose revenue depends solely on licensing the Mac OS. This move will result in several quarters of red ink. But it will make the system software group accountable to the market rather than to other Apple divisions. Eventu-

ally, a strong licensing business will help Apple pay for the continuing development of the Mac OS.

Make Them Understand

In addition to managing its business more pragmatically, Apple must manage public perception more effectively. As much as recent events point to significant problems, it's absurd to think that they mean Apple is going out of business.

Apple is selling record numbers of computers—over a million Power Macs in the last three months of 1995. The Mac is extremely successful and has tremendous customer loyalty in a number of key markets, and Apple has one of the best-recognized brands in the world and virtually no debt. These aren't signs of a company going down the tubes. But the constant funeral preparations by critics are a sign that Apple is doing a poor job managing the public's understanding of the company's state of affairs. The danger is that the constant doomsaying could become a self-fulfilling prophecy. Potential customers hearing only about Apple's troubles may be chased away.

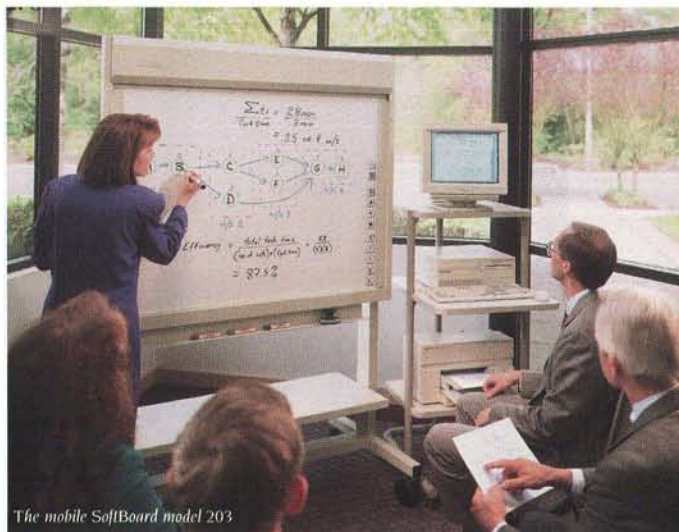
Once Apple defines a clear and sensible strategy, the company really needs someone at the executive level who can help customers, investors, business partners, and employees understand how Apple management will restore order and move forward.

Don't Talk. Act.

The success of the plan I've outlined depends on one more essential element: if Apple's current board and management are to remain at all (and this is a dubious choice at best), they must stop believing their own hype.

These spin doctors have failed miserably in convincing the outside world of the company's health, but they have succeeded horrifically in convincing themselves that their occasional successes have been the results of sound planning and good management, rather than the fruit of rare and unpredictable flashes of competence.

Miracles don't last forever. Apple must outline a plan for a real licensing effort and restructuring its business. It must communicate that plan quickly and clearly. And then Apple must prove that it has the courage of its convictions by eschewing its classic cosmetic restructuring programs in favor of real change. **m**



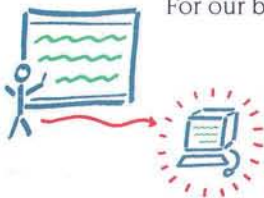
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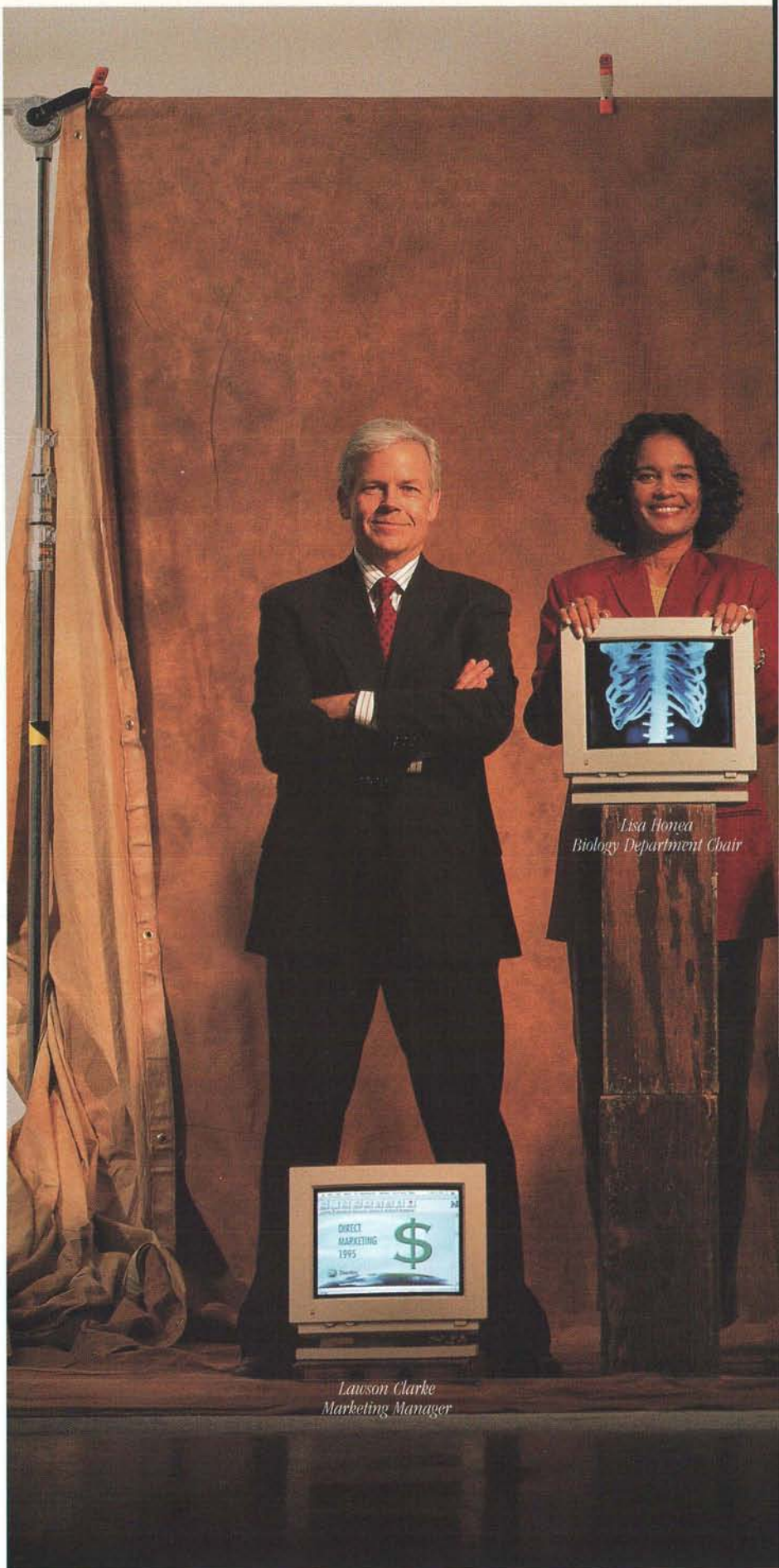
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The Desktop Critic

by David Pogue

You, Too, Can Become a Millionaire Overnight

EIGHT BEST-SELLING MAC PRODUCTS THAT DON'T EXIST—YET

IN 1985, RAYMOND LAU, A NEW York teenager, wrote an obscure shareware file-compression program. Its name was StuffIt; now he's rich. In 1990, Lloyd Chambers wrote a little program known as DiskDoublers; today, he's driving a BMW. A programmer I know wrote a couple of shareware programs; now he makes \$28,000 a year in shareware payments alone.

Such stories prove that the American success fable can happen—even today. Invent the right gadget, solve the right problem, fill the right niche, and the world will beat a path to your E-mail address. Look at ATM, or FileMaker, or RAM Doubler. You, too, like Bill Gates, can be worth \$20 billion by age 35.

In fact, I'm going to make it easy for you. I'll give you the ideas. All you have to do is be the first to produce and market these best-sellers-to-be. Selfless altruist that I am, I ask for nothing in return—except a handshake, a mention in the Read Me file, and 10 percent of the gross.

Concatenator Pro

Can somebody explain to me why Apple's CD-ROM drive requires five extensions in your System Folder? Why Microsoft Word 6 needs six extensions just to run? You need three extensions for QuickTime, seven for PowerTalk, eight for QuickDraw GX—and, incredibly, *twelve* for Open Transport!

Why can't programmers confine their start-up code to a single extension icon? I don't care if it's a 2MB icon—I just don't want to have to turn twelve extensions on or off individually to disable some feature.

That's why Concatenator Pro will be a hit. It's a simple drag-and-drop application: round up as many extension icons as you like, drop them onto the Concatenator Pro icon, and it spews out a *single* extension icon that incorporates the code of all of the originals. How glorious: you'll

have one icon for CD-ROM, one for file sharing, and so on. Troubleshooting and configuration will be so much easier!

In the unlikely event that you need your original splintered constellation of extensions back, you can drag your concatenated superextension icon onto Concat Pro's icon again—and this time, it spits out the original batch.

Uninstaller Plus

For years, a program called Uninstaller has been a best-seller in the DOS/Windows world. But nobody wrote a Mac version. People said the Mac didn't need it. To remove a program, you just drag it to the Trash—right?



Not anymore. Today's programs deposit their own proprietary junk into your Preferences, Extensions, Control Panels, Startup Items, and other folders. What we need is a quick, simple utility that clears out all that crud when we remove the culprit program.

Carpal Diem 1.0

Experts say that the keys to avoiding repetitive strain injuries (RSIs) are correct posture and regular breaks. But we all know that when you're deep in that hypnotic Mac trance, sucked into some

brainstorm or round of *Myst*, the real world evaporates. You're supposed to be thinking about ergonomics and rest breaks? Forget it.

Enter Carpal Diem, a small but ingenious control panel. It shows you graphically exactly how rotten your typing habits are, displayed as a time line (see "Carpal Tunnel Panel")—because what matters isn't how many hours a day you type, but how *intensely* you type. Better still, the program can display friendly reminders—not just every few minutes, as the shareware program TakeABreak does, but every few thousand keystrokes, which is what we really care about. It can also print out clever little reports that analyze your work habits and make suggestions.

Alas, nobody will write this program. Some user would get wrist pain despite Carpal Diem's advice, and the lawyers would descend like rain.

www.pricedex.com

You see these ads on TV all the time: "We will not be undersold!" "We'll beat any price!" "Pepto-Bismol, \$1.95 this week only!"

Half the time, though, I suspect we're being scammed. The advertiser knows we don't have time to comparison shop for each little \$1.95 item. We're helpless. Shoot, how would *anyone* know what Pepto-Bismol normally costs?

The PriceDex Web page changes all that. Each week, this service accepts a modem dump from every retail store in your area. Each transmission contains that store's inventory and current price list.

All you have to do is dial in and search for the item you want. Immediately, you're shown a list of local stores that carry it—and a graph of the various prices (see "www.pricedex").

"Aha," you're thinking, "but what store in its right mind would participate
continues



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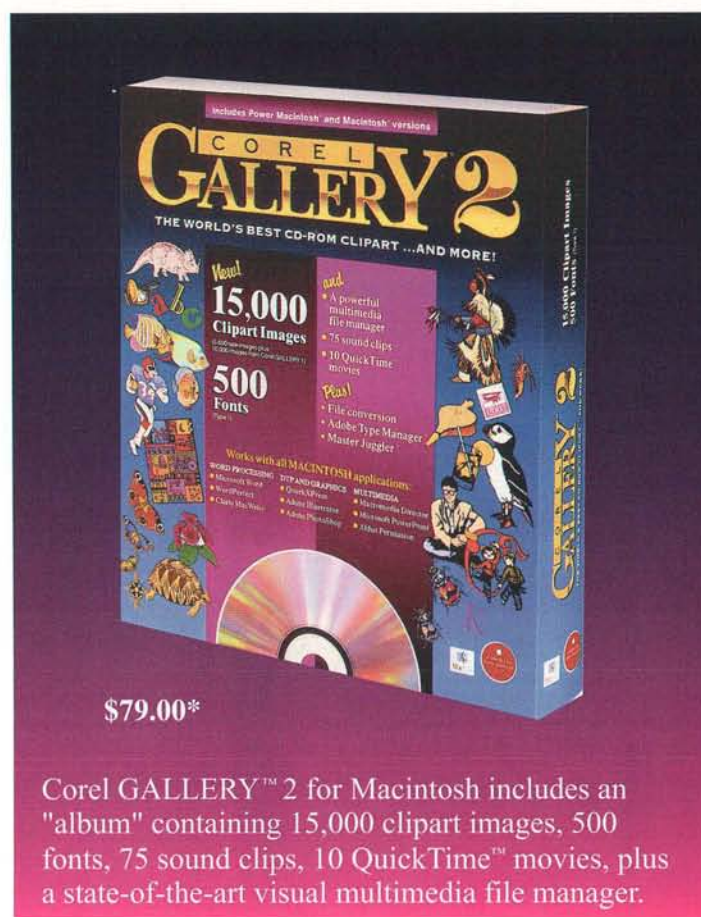
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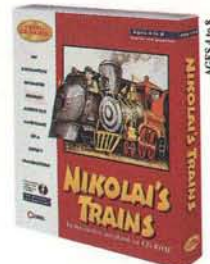
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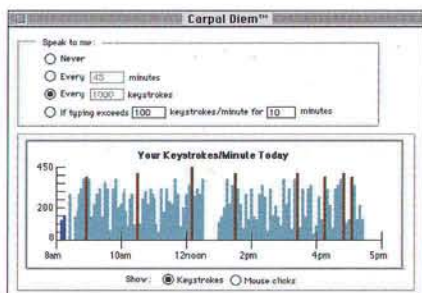
in such a program?" The answer is, of course, all of them. Each would be too paranoid to consider being left out. And the dealers that genuinely *do* offer good prices would be only too happy for the free advertising.

VideoSpigot

The SuperMac VideoSpigot was a cheap, simple NuBus card that turned your camcorder footage into high-quality QuickTime movies. Customers came by the thousands, gobbling up VideoSpigot cards.

So what did SuperMac do? It discontinued the VideoSpigot.

Today, if you want to make QuickTime movies, you have a handful of unappetizing options. Choice A: Buy a "pro" card in the \$4000 range (like the



Carpal Tunnel Panel The Carpal Diem control panel graphs your keyboard and mouse activity for the day.

Truevision Targa-2000). Choice B: Buy a Quick-Cam for about \$100—and live with its jerky, low-res, black-and-white movies. Choice C: Buy a new Mac that has built-in video inputs. But except for the Power Mac 8500, those Macs make QuickTime movies with a top speed of 15 frames per second—too jittery. Choice D: Get a SpigotITape, the VideoSpigot's \$800 descendant. But it, too, has essentially been abandoned—Radius has no plans to make it compatible with QuickTime 2.0 or System 7.5.

Between \$100 and \$800, meanwhile, stretches a market niche screaming to be filled. What's *wrong* with these companies? Why don't they reintroduce the plain old \$300 Spigot? I say: If you build it, they will digitize.

QuickTime Performer

I'm astounded that nobody has thought of this: a music sequencing program that uses QuickTime 2's Musical Instruments as a synthesizer.

For years, music recording programs like Mark of the Unicorn's Performer and

Opcode's Vision required a MIDI synthesizer keyboard for playback, since the Mac could produce only four cheesy notes at a time. But then Apple licensed 30 realistic instrument sounds from Roland, the synthesizer maker, and included them with QuickTime 2.0. With these Musical Instruments and the right software, your Mac can be a MIDI synthesizer.

Some notation programs can use Musical Instruments. But the world still waits for a genuine, tape-recorder-like,

music-recording program—a sequencer, as it's known—that's clever enough to use Musical Instruments. Such a program would bring cheap, high-quality music-making to schools worldwide, to PowerBook-porting presenters, and to music hobbyists everywhere.

ExtensionsWorld Magazine

A brand-new Power Mac 8500 comes with 120 extensions—right out of the box. *continues*

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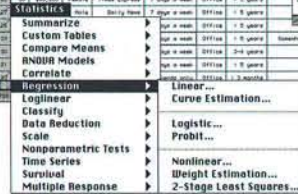


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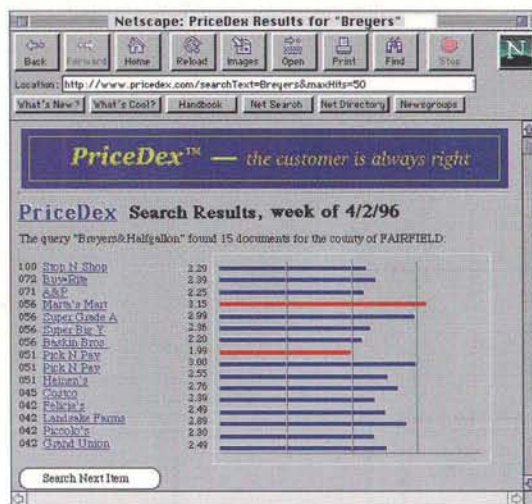
How is the ordinary Macintosh fan supposed to keep them all straight?

Yes, folks, it's *ExtensionsWorld*, the magazine for those who loathe the jungle in every System Folder (IDG, \$24.95 for 12 issues). Sample articles from the premiere issue: "65 Extensions You Can Throw Away Right Now," "The ExtensionsWorld Secret-About-Box Awards," "Exclusive: The Logic behind the System-Enabler Numbering Scheme Revealed," and "A/ROSE: Useful Software, or a Cruel Apple Hoax?"

Each issue also contains a listing of every single extension, enabler, patch, and system update Apple has ever released, complete with information on where to get it, whether to get it, and whether you can throw it away.

PocketBoot

Why is it that the faster the Mac model, the longer it takes to start up? My Power Mac 7100 takes nearly two minutes to



www.pricedex The PriceDex Web page. Each store's name is a Web link to additional store information.

start up, and almost four minutes to recover from a system crash.

That's why the PocketBoot is such a terrific gadget. It looks like a sunglasses case, connects to your SCSI jack, and contains about 2MB of RAM. That's just enough room to store the information your Mac needs to start up: the routines,

extensions, control panels, and so on. With all of this stored on a glorified RAM disk—the PocketBoot—your Mac will start up in about eight seconds. By my calculations, the PocketBoot will save the average Macintosh user about 35 hours each year of sitting there staring at the Mac OS logo.

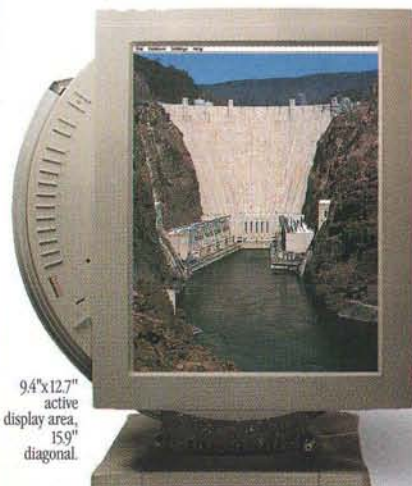
The Upshot

Right there you've got enough great ideas to make eight millionaires—and I haven't even told you about the Modem Port Multiplier, the Word Tool-Bar Eraser, or the Newton Home Entertainment Center Remote Control Kit.

But if you play your cards right, you should be able to follow the path of self-made computer-industry entrepreneurs before you. You'll experience the Five Phases of Ultimate Product Success: glowing reviews, acclaim on the Internet, blockbuster sales, enormous profits, and finally, buyout by Microsoft. **m**

Contributing editor DAVID POGUE is the author of *Mac FAQs [Frequently Asked Questions]* (IDG Books Worldwide, 1995)—a book that made him a millionaire overnight, when measured in pesos.

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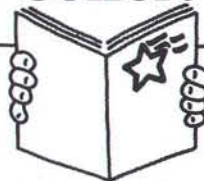
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How to make a full recovery when disaster strikes.

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1. How to get disaster insurance for your data.

Data loss will happen to half of us this year: meteors, fire, theft, earthquakes, power surges, hard disk failure, human error—it goes on and on. But with Retrospect and a solid backup strategy, nothing can harm your data.



2. Before you back up.

Figure out what you'll back up to—removable cartridges or a dedicated backup drive. For lots of files, you want a device with the capacity for unattended operation—say DAT, DLT, or an autoloader.

3. How to back up if you're a small company.

Retrospect will show you the best way. The EasyScript™

feature sets up a backup strategy from your answers to a few simple questions, then carries it out automatically to whatever media you select.

4. How to back up if you're a big company.

The answer is Retrospect Remote®, our network backup product. Use a set schedule or the more flexible Backup Server™ which automatically backs up Macs with the oldest backup first—ideal for PowerBooks that appear and disappear off the network. The bottom line: Retrospect Remote covers your network like a blanket.

5. How to laugh in the face of danger.

We're not suggesting standing on the top of the building during a lightning storm. But when disaster strikes, Retrospect can restore whatever you're missing—files from your latest backup,

older files, or the entire hard drive.

Take the next step. There has to be a reason why more people rely on Retrospect than all the rest combined. Why it

consistently earns the top scores, the best reviews. We have the answers. Call us at 800-982-9981 for our *Understanding Backup* white paper. It would be a disaster not to.



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News

NEWS FLASH

Apple Fires Spindler, Brings in Amelio

A MOVE TO FIX ITS
FLAWS AFTER WEEKS OF
UNCLEAR DIRECTION

by Galen Gruman

Finally, Apple may be able to put its house in order. After weeks of turmoil surrounding a \$69 million loss because of lower-than-expected margins during the Christmas buying season; after months of rumors about possible mergers with and buyouts by companies such as IBM, Sun Microsystems, Sony, Fujitsu, Motorola, and Hewlett-Packard; and after a year of high-level executives' (15 of 45 have left) and key engineers' departing Apple for greener pastures, Apple's board of directors took real action.

On January 31, it fired Apple CEO Michael Spindler and demoted chairman of the board A. C. "Mike" Markkula, Jr., a founder of the 20-year-old company, to vice chairman. The new leader, announced on February 2, is Gilbert Amelio, an Apple board member who is now president, CEO, and chairman, which gives him unprecedented

power at Apple. Amelio had run National Semiconductor, a chip maker that he is credited with returning to profitability during a nearly five-year stint at the top.

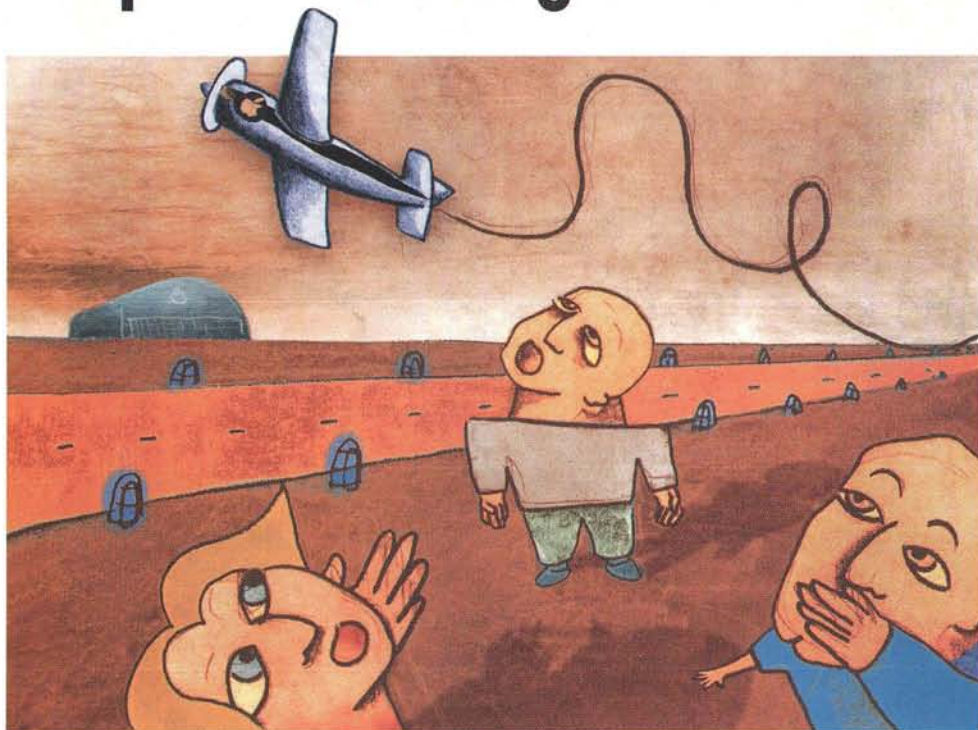
The board's action was welcome after three weeks of bland statements about restructuring Apple—something Apple has done once or twice a year for years, with little effect—and refocusing on the

same key markets it has pursued for ten years.

What Went Wrong Apple is the number three personal-computer maker in the United States, with a worldwide market share of about 9.4 percent—and the only non-Windows company to have kept a steady market percentage despite continuing improvements in the Intel-Microsoft PC platform. Between Octo-

ber 1 and December 31 alone, Apple sold more than 1 million Power Macintoshes.

So why the financial shortfall? Because Apple, facing a parts shortage, shifted production to its lower-end Power Macs and Performas during the Christmas buying season. But it turned out that customers wanted higher-powered computers, and Macs like the 7500 were hard to get.



JOHN RITTER

Stuck with unsold Macs, Apple dropped prices, cutting its profit per system from 27 percent a year earlier to 15 percent this fall. That's less than PC clone maker Dell Computer—which doesn't design its operating system or motherboards—made.

Apple's mistake was simple, but it was typical of the company's woes under Spindler's three-year reign. It has consistently miscalculated product development and manufacturing schedules, as well as customer demand.

A \$69 million loss is not a lot of money for a company with \$1.1 billion in reserves; even with an expected \$200 million loss in the fiscal quarter ending March 31, Apple is in no danger of collapse. (Although the company does have about \$2 billion of unsold parts in inventory.) But for industry and financial analysts, the loss was one miscalculation too many.

Apple has also mismanaged its technological development. Groups within the company battle for resources and management approval, rather than help make strategies work.

At the same time, independent Mac developers have complained of Apple's longstanding tendency to promote a new technology—QuickDraw GX, AppleScript, balloon help, PowerTalk, publish and subscribe, Taligent, ScriptX, and now perhaps OpenDoc—and then lose interest. Even when a technology has promise, Apple relies on other companies to find a compelling use, rather than use its AppleSoft division to create an application that will make people want the technology, as Microsoft does with its programs to promote new Windows technologies.

A Renewed Focus Apple says it will take several steps to refocus the company on

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MACWORLD PRESENTS
AN EXCLUSIVE REPORT
ON PAGE 48.

profitable and forward-looking areas. Before he was fired, Apple CEO Spindler promised "to fundamentally change our business model." That effort is continuing. Among Apple's intended actions:

- Rely on clone makers to serve the home and small-office markets.
- Spend less time on side projects and aim the company's energies on key Mac strengths, such as publishing, the Internet, and education.

However, the company is only beginning to reveal how it will substantively address its management problems and accomplish these goals.

Accomplishing these objectives will mean expanding Apple's clone-licensing effort.



Apple's new CEO, Gilbert Amelio

Ironically, this reverses Apple's actions of 1995, in which it backpedaled on its initial promises to make the Mac OS license widely available. This reliance on clone makers—and Apple will need

continues on page 48



Record crowds at Macworld Expo came to see hundreds of products.

Macworld Expo Delivers Hot Products

WEALTH OF PRODUCTS
DRAWS RECORD CROWD

by James A. Martin

Outside it was cold, but it was piping hot inside. Despite Apple's recent financial woes, the 1996 Macworld Expo in San Francisco boasted nearly 70,000 attendees (a record that marked a 10 percent increase over last year) and more new Mac products introduced than ever before. Here are just a few products shown at Expo, not previewed in previous issues, that caught our editors' eyes.

Fly Your Mac Flight-simulator aficionados demand realism, and Flight Unlimited (\$69.95) from Looking Glass Technologies (617/441-3946) has realism to spare. You'd expect hours of meticulous work on perfecting the flight models of the aerobatic flying machines (including a sailplane), but what you might not expect is the hyperreal treatment given to the external environment.

The Flight Unlimited artists did much of their development in an airplane,

photographing terrain from two different altitudes. They then digitized the photos and mapped them onto a three-dimensional surface, to breathtaking effect. Looking Glass expects Flight Unlimited to be available in March.

The Mercedes of Digital Cameras The screen is the star of the \$1000 QV-30, the new digital camera from Casio Computer (201/361-5400). The QV-30's 2.5-inch, active matrix, antiglare color display affords a better look at your subject (compared with a traditional viewfinder). And you can check out your digital snapshots on the spot, deleting any unwanted images. The camera stores up to 96 JPEG-compressed photos in flash memory, which you can transfer to a Macintosh or dis-

continues

IN THE NEWS

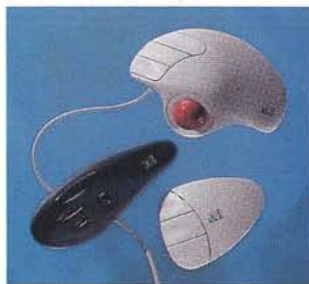
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ROBERT PERRY

After a successful run on the PC, Logitech's TrackMan Live, TrackMan Marble, and MouseMan Cordless (clockwise from left) make their Mac debut.

play on a television via the included cables.

Point Your Way Logitech (510/795-8500) introduced the \$149 TrackMan Live, a remote, radio-controlled pointer for use up to 30 feet from a Mac; and the \$39 TrackMan Marble, a thumb-operated trackball that promises precise tracking with minimal finger movement. The company also unveiled Mac versions of its \$89 MouseMan Cordless, which transmits trackball movement via radio frequencies rather than a cord.

Visual Spreadsheets Excel is powerful, but it can be a bear to use unless you're a trained professional. Building a spreadsheet with Keep It Simple Spreadsheet (KISS), from Casady & Greene (estimated price \$129; 408/484-9228, csg@casadyg.com), is a simple matter of dragging cells and mathematical operators onto a blank worksheet and then connecting them with lines, as you would connect a flowchart.

Simple relations between numbers are immediately obvious, and for the more advanced user, complicated formulas can be created and reduced to boxes with input and output registers. Casady & Greene also includes step-by-step instructions, as well as templates for common calculations.

Easier Paper Chase The office paper chase just got a little easier to manage, thanks to ePaper, a \$169 full-bodied document-archiving and -management application from Second Glance Software (360/692-9241, info@secondglance.com). The program uses Xerox's TextBridge 3.0 OCR technology to translate scanned documents into editable text; lets you quickly annotate files using electronic rubber stamps, sticky notes, and bookmarks; creates thumbnail information on every document for keyword and other searches; and works with Apple, Epson, Hewlett-Packard, and TWAIN-compatible scanners.

systems

Copland's New Abilities

NEW OS LETS YOU ORGANIZE FILES BY CONTENT

by Galen Gruman

Apple has long promised that the Mac will be an active assistant, helping you wade through your data and make sense of it, not just serving as a repository for it. The next major release of the Macintosh Operating System, code-named Copland and due out in late 1996 or early 1997, will move the Mac a larger step in that direction.

Here are some of the new capabilities you can expect.

View by Content

A new technology tentatively called a view window lets you organize information based on your criteria.

One way to use it that wowed the audience was Copland's ability to find and organize documents based on their content. You enter words you want Copland to find in documents, and it then creates a window that contains all documents with the words, along with a ranking of how closely the document fits your search request. For example, a document that uses the words frequently is judged to be more relevant to your request than a document that contains only one instance of the word. This feature also lets you select a document and have the Mac OS find documents with similar content—no need for you to enter the search text.

Apple will use this pattern-matching technology for more than document-content searches; the technology will also let users view all applications installed on a system, or all files created by a specific user or modified after a certain date.

You can save any view window and have it automatically update with any new or changed documents the next time you open it, thanks to Copland's multithreaded design that allows powerful background processing.

Interface Refinements

Copland will have refinements to the user interface through-



KEVIN CANDLAND

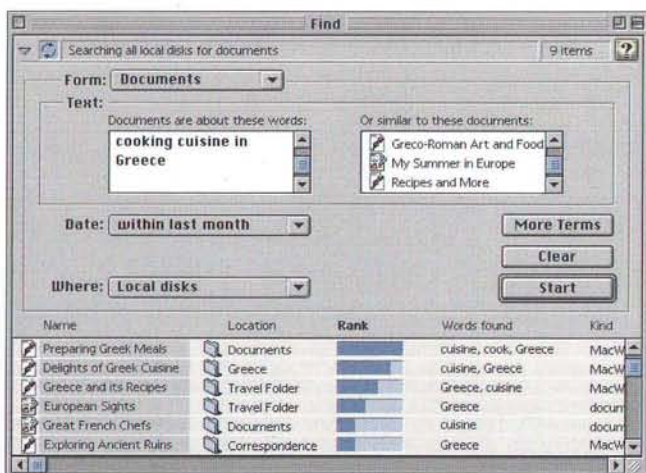
One for Business, One for Pleasure

Personal document scanners have taken desktops by storm, and the \$429 ScanJet 4s, pictured here, is Hewlett-Packard's (415/857-1501) entry. The 200-dpi gray-scale scanner comes with Visioneer's PaperPort 3.0 document-management software.

For less text-intensive jobs, Storm Software's (415/691-6600, sales@stormsoft.com) \$259 EasyPhoto scanner is a quick and easy way to scan in photographs. The 24-bit color scanner handles originals up to 5 by 7 inches, and comes with software for scanning, editing, and displaying your images.—CAMERON CROTTY

out. One that drew audience applause was a subtle change to the Finder's file-view capabilities. Now, when a file name is too long to fit in the list view (view by name), the Finder just displays the first part of the name. If you have a long document name that ends with significant information, such as a revision number or date, you can't see that

Copland, Vito Salvaggio, concedes that today's System Folder is a confusing morass of files, extensions, and preferences that makes system management and troubleshooting difficult. However, he notes that this restructuring may not make it into the first version of Copland. For Apple to meet its end-of-1996 release date, the company may have to pull



The Copland OS will let you find and organize your data by its content.

information. But Copland's Finder shows part of the beginning of the file name and part of the end, so you have enough context to readily tell files apart.

The list view is also customizable, so you can change the order of displayed information (for example, you might want the modification date—rather than System 7.5's default, the file size—to follow the file name). Copland lets you change the width of each piece of file information, as you can adjust most spreadsheets' column widths, and it will even adjust character spacing to squeeze in as much text as it can.

Restructured System Folder

Apple also plans to restructure the System Folder so that you can tell which extensions the system needs and how recent they are. Apple's product-marketing director for

some features and deliver them in 1997 as an upgrade.

Custom Configurations

Salvaggio also demonstrated some previously announced features, including the ability to set up multiple users on one system, each with different preferences and access capabilities. Salvaggio expects individuals who need different settings on their systems to use this feature as well. For example, a notebook user might have one group of settings on the road, when server access is unnecessary, and a different group when plugged into the office network.

You can sort of do this now by using System 7.5's Extensions Manager to save different extension and control-panel settings, but that requires a restart. Under Copland, switching user settings requires only a partial restart, which takes much less time.

Internet WATCH

BY CAMERON CROTTY

The Right Connection

When it comes to serving up content on the Internet, Macs are second only to Unix boxes in popularity, and the latest release from StarNine, now a division of Quarterdeck (510/649-4949, info@starnine.com), should add to the Mac's momentum. The \$1295 WebStar SSL Security Toolkit coexists with any other Web server, and handles clients that attempt a secure connection using Netscape's SSL protocol.



Early this year, StarNine is planning more support for Web-based commerce. Its Business Toolkit will consist of a CGI script and a helper application to help Webmasters move information from HTML forms into processing applications (such as orders databases, credit card-checking software, or online-banking software).

In other news, Intercon (703/709-5500, info@intercon.com) has announced that version 1.1 of its \$495 InterServer Publisher will be Open Transport-native, and that it will ship with Adobe Systems' PageMill HTML authoring software. Intercon also announced a \$295 domain-name server called InterServer DNS.

New Browsing News

Macintosh Net surfers should soon have more browser options.

In the 3-D space, Virtus (919/467-9700, info@virtus.com) is shipping the \$29 Voyager VRML 3-D helper application. You can download a trial version from <http://www.virtus.com>.

And Microsoft (206/882-8080) recently released a beta of its Internet Explorer browser for the Mac, which should ship this spring. You can download a version from <http://www.microsoft.com>. (Microsoft also bought Vermeer Technologies' FrontPage Web-authoring software.)

More Fetching Fetch

For those of you not using your Web browser to download files from FTP servers, version 3.0 of Fetch, by Jim Matthews, is available. New features for the latest version of the Macintosh FTP client include bookmark lists, plus support for System 7.5 drag and drop, multiple connections, and native Open

Transport code. The single-user license fee for Fetch is \$25; for more information, browse <http://www.dartmouth.edu/pages/softdev/fetch.html>.



Systems WATCH

BY GALEN GRUMAN

A Step Closer to CHRP For the first time, Apple has publicly shown the Mac OS running on an IBM system. The IBM system—based on the PowerPC platform once known as CHRP and codeveloped by Apple, IBM, and Motorola—ran System 7.5 and several programs, including Adobe Photoshop 3.05 and Microsoft Excel 5.0. Apple presented the system at the Demo 96 conference in late January. According to sources, engineers at Apple have resisted working on the CHRP project, and the demonstration was meant to make Apple management's commitment to the new platform clear.

First Japanese Mac Clone Now that it has shipped its PowerWave and PowerCurve Mac clones, Power Computing is readying to enter the Japanese Mac market, which is Apple's second-largest market. Power Computing has opened an office in Tokyo and plans to launch a Japanese Mac-clone line later this year.

StarGate's Takeoff Delayed Power Computing (512/258-1350) has delayed the release of its \$249 StarGate riser card, which adds two NuBus slots to the company's PCI-based PowerWave and PowerCurve Mac clones. The company found some incompatibilities with some NuBus cards that slowed performance. Affected cards include the Radius Thunder IV GX. A fixed card is due out about the time you read this. Similarly, Second Wave's (512/329-9283) Xpanse PN NuBus-to-PCI adapters do not well work with some NuBus cards, including FWB's SCSI accelerators.

The Elephant-Size Fix To help PowerBook 5300, 2300, and 190 owners deal with a variety of problems, Apple (408/996-1010) has released a software patch—a 14-disk replacement of System 7.5.2 available for downloading from Apple's Internet site (<http://www.support.apple.com>). Fortunately, you really only need to download disks 1, 8, 10, 11, 12, 13, and 14; the others are unchanged. You can get a set of disks from Apple's toll-free support line, 800/767-2775. The fix is also meant for people who buy Apple's PowerPC upgrade card for the PowerBook 500's.



Look under Version in Get Info to make sure your PowerPC PowerBook's Finder is at version 7.5.4.

publishing

Color Central Image Server

SPEEDS OUTPUT AND SIMPLIFIES JOB TRACKING

by James A. Martin

Faster output speeds and improved job tracking are among the new features of Color Central 3.0, the OPI 2.0-based image-server software from Luminous (206/628-4534). Luminous is the newly formed spin-off company of Adobe Systems' prepress division.

Color Central 3.0 lets prepress houses and others use a Microsoft Windows NT-based print server, with Macs as their networked clients. NT supports multitasking over multiple CPUs.

The client/server architecture also lets Color Central



send job-tracking information to client Macs, freeing the server to focus on handling print jobs. Before, users had to read the print job's status off the server's monitor.

The \$3995 Color Central 3.0 is expected to ship in April.

NEWS FLASH

Corel Buys WordPerfect

MAC VERSION STILL ALIVE; OTHER PORTS POSSIBLE

by Cameron Crotty

Just a few years after buying WordPerfect Corporation in hopes of assembling a company that could compete with Microsoft in the operating systems and applications businesses, Novell has sold the WordPerfect division to Corel, a developer best known for its Windows illustration software.

The January 31 sale completes Novell's divestiture of its previous acquisitions; earlier, Novell sold its UnixWare business and ended its Digital Research DOS business.

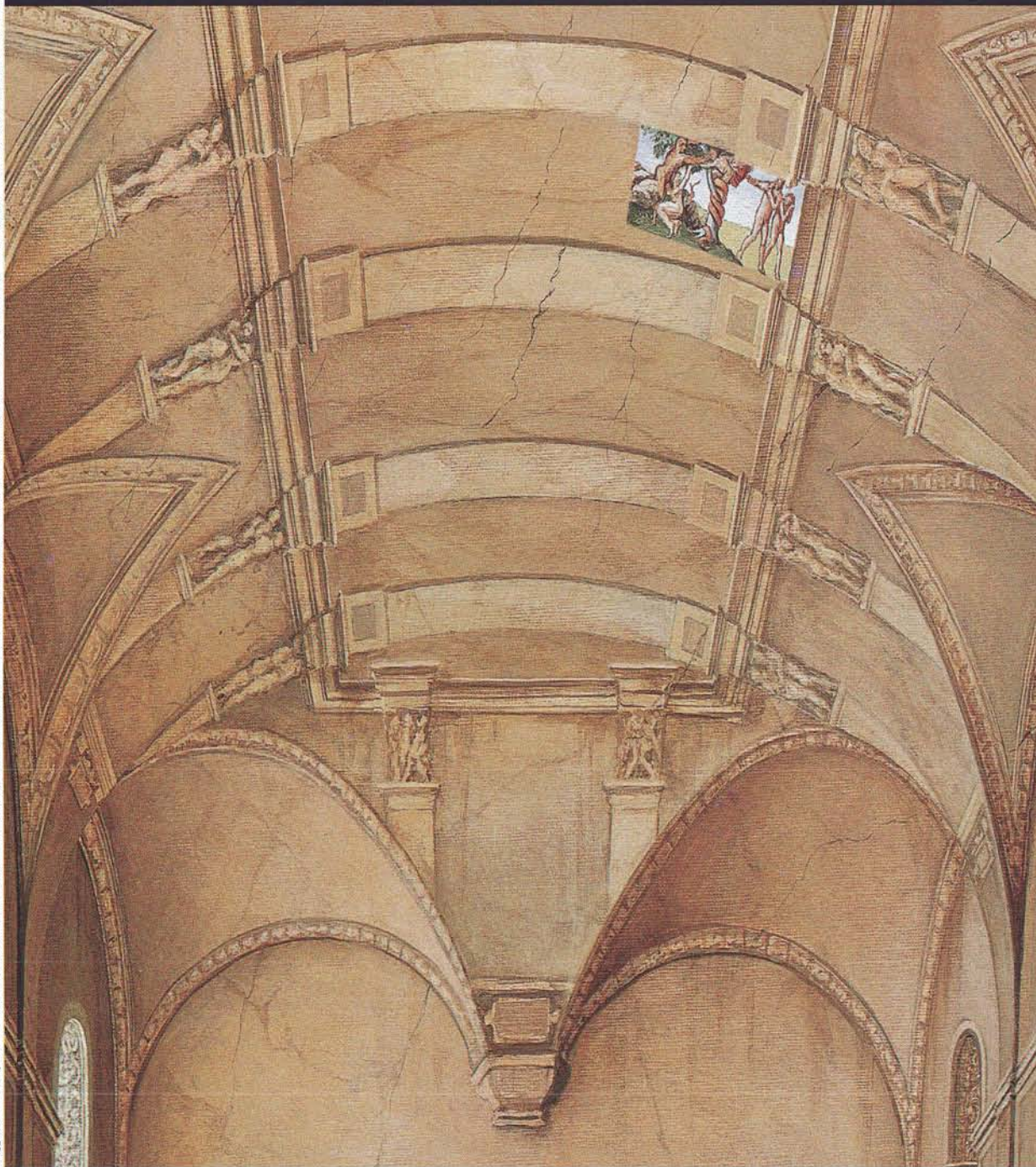
The future of Mac WordPerfect is unclear. According to sources, the company has gutted the WordPerfect team

from about 16 employees last summer to 2 this winter.

But Glen Mella, previously head of the WordPerfect Business Group, tells *Macworld* that "we're not going to leave [the staffing level] there. The right people that know this product will be involved with us."

At a press conference, Corel CEO Michael Cowpland was positive but unspecific about Corel's plans for the WordPerfect applications on the Macintosh, and hinted at increased efforts to bring Corel's other products into the Mac space. One Corel employee says Corel will port the CorelDraw illustration software to the Mac this June.

What if Michelangelo had been confined
to an 8½ by 11 inch space?



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multimedia

The Next-Generation CD-ROM

WILL TODAY'S DRIVES SURVIVE DVD?

by James A. Martin

For several years, deciding what CD-ROM drive to buy was about as simple as it gets: Double-speed or quad-speed? Internal or external?

But this year, consumers are suddenly facing more hardware choices than ever before. By this spring, the first 8X CD-ROM drives for the Mac will begin competing with drives offering 4X and 6X transfer rates. And by year's end, drives based on an entirely new, high-capacity CD technology called DVD (for Digital Versatile Disc) are expected to show up on store shelves.

Meanwhile, the promise of hardware speed enhancements is tempered by the fact that the vast majority of CD-ROM software developers are still optimizing their applications to take advantage of the now-obsolete double-speed CD-ROM drives' data-transfer rate.

From 4X to 8X

Quad-speed drives offer data-transfer rates of 600 KBps—four times as fast as the first generation of CD-ROM drives, hence their name. Currently, 4X drives dominate the market and sell in stores for \$200 to \$350.

A few vendors are now selling 6X drives (with transfer rates of 900 KBps) for \$400 to \$600. Meanwhile, NEC Technologies says it will be among the first to sell an 8X CD-ROM drive for the Macintosh. Although details weren't firm at press time, NEC's 8X drive will be available at a street price of \$450 to \$500 by midyear.



Fast-Forward to DVD

Late this year, several CD-ROM drive developers—including Toshiba, Sony, Matsushita, and NEC—are expected to release the first DVD drives. DVDs have the same physical format as today's CDs, yet DVDs will store up to 4.7GB of data (compared with today's CD limit of 660MB). The increased capacity will let developers add copious amounts of full-motion, full-frame video (using MPEG-2 compression), 3-D and virtual-reality animations, and other multimedia.

The first DVD drives are expected to be pricey, between \$500 and \$700. Although the hardware is still in development, DVD drives are expected to have transfer rates that exceed the 8X CD-ROM drives' 1.2GB per second. And while DVD drives will be able to play existing CD-ROM software, none of the current CD-ROM drives will be able to play DVDs.

But Where's the Software?

For now, most software developers are keeping their sights on the largest base of users—those with double-speed CD-ROM drives.

In addition, software companies aren't scrambling to keep up with the hardware because, for most applications,

the 4X to 8X speed enhancements are "mostly incremental," according to Ted Pine, chairman of InfoTech, a multimedia research firm.

While developers say they're not focusing on optimizing software for the 4X, 6X, and 8X drives, the coming DVD format is another story. "That's where the real excitement in the industry is," says Stuart Burden, executive director of development for Compton's New Media. But Burden and other developers contacted wouldn't comment on any specific plans for DVD drives.

So What to Buy Today?

The majority of software initially available for DVD drives is likely to be large databases, such as telephone

directories and mapping programs, along with a few games. It will be at least late 1997—some analysts guess 1998 and later—before DVD drives drop significantly in price and offer a variety of eye-popping, next-generation software titles.

As a result, a 4X to 8X CD-ROM drive will still be a viable purchase for the next 18 months or more, analysts agree. If you frequently download large chunks of data from a CD, you should buy the fastest CD-ROM drive possible, suggests Kathy Klotz, a multimedia analyst for market-research firm Dataquest. Otherwise, buy a top-rated drive at the best price, she says, and don't worry about the 4X, 6X, and 8X speeds.

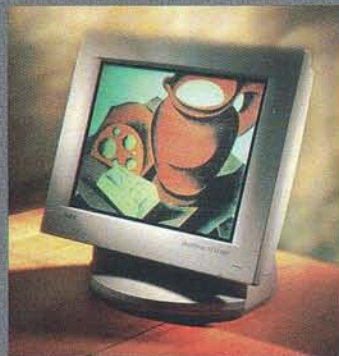
Desktop LCD Monitors Get Cheaper

BUT CAN THEY COMPETE WITH CRTS?

Visionaries have long predicted that LCD panels would replace CRT monitors as the standard display device, but the high cost of active matrix screens in monitor sizes—thousands of dollars each—has kept that no more than a vision. Now, NEC Technologies (708/860-9500) has brought it a little closer to reality with the \$4000 12-inch MultiSync LCD200 and the \$6000 13-inch MultiSync LCD300. While hardly competitive with the \$300 to \$500 for a 14-inch CRT, these prices are a third of what NEC charged for last year's comparable 13-inch LCD1280 LCD display. I evaluated a prototype unit for its visual quality, since LCD panels historically don't have the clarity that CRT monitors do. The result?

The screen is big, bright, clean, and crisp. I did notice the slight pixelation that all LCD panels seem to have compared with a CRT, and fluorescent lighting can make color backgrounds lighter. But it is clear that an LCD panel can be an effective replacement for a CRT.

—GALEN GRUMAN



NEC'S LCD DISPLAYS LOOK IMPRESSIVE AND NOW COST MUCH LESS.

Special REPORT

New Mac Buses on the Horizon

BY CARY LU

With the next major revision to the Macintosh platform due in early 1997, based on the joint IBM/Apple design recently rechristened the PowerPC Platform, Apple is poised to change some of the Mac's basic peripheral-connection technologies.

One technology area is Firewire, a high-speed peripheral bus that might replace SCSI. The other technology area covers low-speed ports such as ADB and serial ports. Here, Apple's decision makers are wrestling over adopting Intel's Universal Serial Bus (better known as USB, and soon to be the new PC standard for serial ports) or sticking with the GeoPort serial design and the ADB design.

The Firewire Connection

The first in a new generation of high-speed devices using IEEE 1394—the fast serial-

port protocol pioneered by Apple as Firewire—are now appearing for digital video; expect to see 1394 become the standard for scanners, digital cameras, music, and storage devices within three years.

What Firewire Offers IEEE 1394 starts pretty much where the two slower protocols, GeoPort and USB, leave off, taking on high-speed data transfer. Unlike SCSI and USB—both of which support only a single host computer—1394 supports multiple computers with up to 63 connected devices on a branching chain. Depending on the spe-

cific hardware, 1394 currently runs at one of three speeds—100, 200, or 400 Mbps (800 and 1600 Mbps are expected in 1997). When two or more devices on the chain are communicating with each other, they automatically adjust to a mutually supported speed.

Other advantages of 1394 include the ability to plug in devices without powering down the computer, and the elimination of device-ID conflicts because devices assign themselves addresses on the fly. Containing only six wires, the 1394 cable is much thinner, more flexible, and cheaper than a SCSI cable. And because 1394 cables can supply up to 60 watts of power, devices can operate without a separate power cord.

Who Has Firewire on Tap?

The first products with 1394 are already on the market: two consumer digital camcorders from Sony, which use 100-

Mbps 1394 to send images in a new compressed digital-video format called DVC. Combined with 1394, DVC will quickly replace motion JPEG as the compression standard for video editing. DVC removes the last vestige of analog signals in video production; its image quality surpasses that of the laser-video disc and professional Betacam formats.

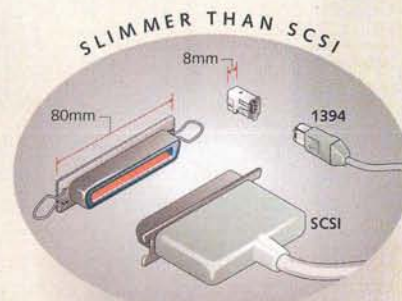
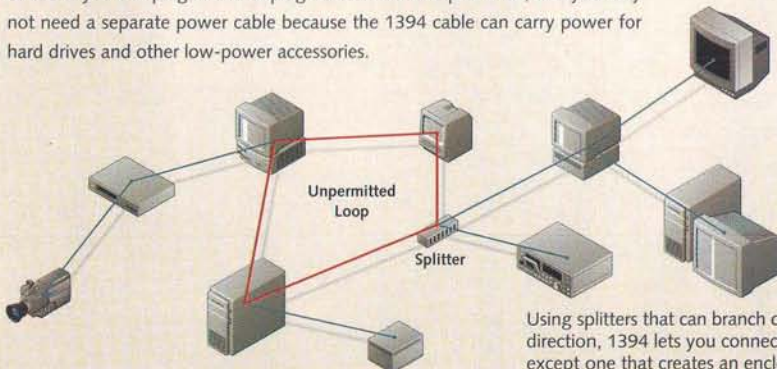
High-end electronic musical instruments are adopting 1394 as a replacement for MIDI; a 1394 connection supports multiple streams of full digital audio along with MIDI-style control codes.

For publishing, 1394 will help make lower-cost, higher-performance scanners and digital cameras possible.

In time, 1394 will also replace SCSI on storage devices, such as hard drives and optical drives. And high-end television sets may someday come with a 1394 port and

Firewire (1394): Faster and More Flexible Than SCSI

Already the standard for digital video, Firewire, now known as 1394, supports up to 63 high-speed devices you can connect in a treelike scheme, as opposed to SCSI's linear chain. Unlike the bulky and unreliable 25- or 50-wire SCSI cables, the compact 1394 cables and connectors contain just 6 wires. Other advantages of 1394: you can plug in and unplug devices with the power on, and you may not need a separate power cable because the 1394 cable can carry power for hard drives and other low-power accessories.



Firewire connectors are about a tenth the width of SCSI connectors and Firewire cables are about half the diameter of SCSI cables.

DVC decompression built in. A computer monitor could also connect via 1394, although a conventional monitor connection will be cheaper for some time to come.

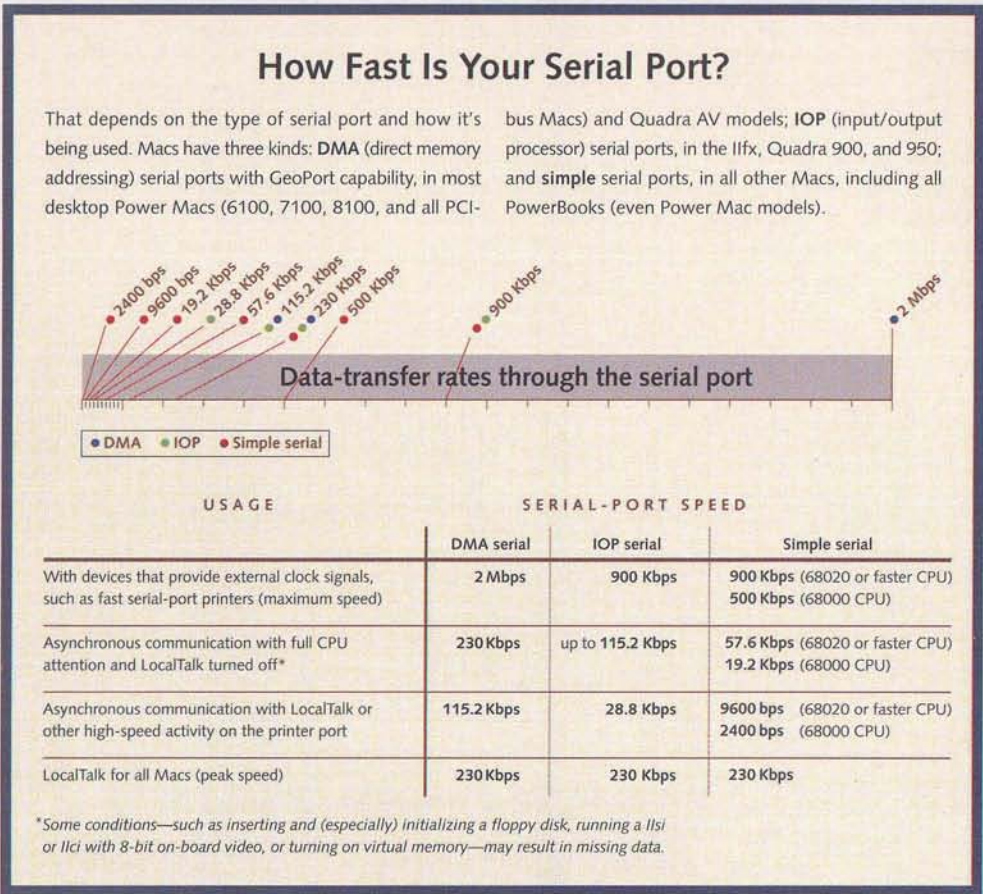
In 1996, PCI cards with 1394 will be available for Power Macs from SCSI-adaptor companies, such as Adaptec (408/945-8600). By the end of 1996 or early 1997, expect to see Macs with 1394 built in—just as SCSI is now. Low-end computers will have a single 1394 port with an internal and external connector, while high-end machines will have multiple 1394 ports.

Revisiting the Serial and ADB Ports

Deciding where to plug in low-speed devices—such as modems, printers, and pointing devices—has always been a simple matter for Macintosh users. But the limitations of ADB and serial ports could force Apple to change the Mac's low-speed port technology significantly by 1998.

Limits of the Past With a maximum data rate of 10 Kbps, an ADB port can keep up with a mouse and keyboard, but not with a graphics tablet. Older Macs' serial ports run at speeds between 57 and 900 Kbps, while desktop Power Macs and recent Mac AV models have a GeoPort, an improved serial port that runs at up to 2 Mbps, fast enough to handle a T1 digital-phone line.

GeoPort and serial-port speeds vary depending on the Mac model, the specific serial devices connected, and whether both ports are working simultaneously (see the chart "How Fast Is Your Serial Port?"). But a GeoPort or serial port can connect to only one device at a time, and no Mac has more than two such ports. At least one PCI card with additional GeoPorts should be available from a



third party by midyear. Apple anticipates mostly telephony products for the GeoPort, including devices that handle both voice and data.

The only GeoPort-specific hardware currently available, Apple's GeoPort Telecom Adapter, is limited to 14.4-Kbps modem connections. However, several companies have announced GeoPort support, including IBM (for its PCs) and AT&T (in telephony products). But overall, the GeoPort seems like a nice technology that can't do very much.

Although Apple has moved toward industry-standard hardware interfaces, such as the PCI bus, it could hardly be expected to adopt the PC's standard low-speed serial ports, since they perform even more poorly than a Mac's.

Will Apple Adopt Another Intel Bus? But now Intel wants to replace the standard PC ser-

ial ports with its Universal Serial Bus. USB has a peak rate of 12 Mbps, with usable throughput of 6 to 8 Mbps—fast enough for CD audio, which can travel with other digital information. Like Apple's ADB, USB supports multiple daisy-chained devices. It was developed as a kind of third-generation ADB (the second generation was Access.bus, a failed standard once promoted by Philips, which is still used in some monitors from NEC Technologies and Sony).

Intel plans to put USB on its Pentium and Pentium Pro motherboards. However, some obstacles may slow its adoption. Intel and Microsoft have different implementations of USB, but both methods can coexist without major conflict. And USB is more expensive to build into computers than either ADB or GeoPort, although the added

cost for USB accessories should be low once high-volume production begins. But USB accessories will initially cost more than the inexpensive accessories currently dominating the PC market.

When Intel was developing USB, it offered to give Apple advance information—if Apple renounced GeoPort. Apple passed but says it may adopt USB if and when PC accessories with USB come out in quantity at prices significantly lower than Mac accessories' prices, which isn't likely until 1997. Several major accessory makers are investing heavily in USB development.

For now, there's no reason to put off buying an ADB, GeoPort, or serial-port device, but if you contemplate getting a big, expensive graphics tablet or an ISDN adapter within the next year or so, you might want to consider a USB version.

Will Quark Sink or Swim?

DELAYS PLAGUE XPOSURE, BUT IMMEDIA SHOULD SHIP MIDYEAR

by Cathy Abes

Not content with QuarkXPress's secure position at the top of the page-layout heap, Quark decided to broaden its scope by branching into multimedia with the QuarkImmedia XTension (previously known by the code name Orion) and into image editing with QuarkXposure (see *Graphics* news, May 1995). Although both products were scheduled to ship by summer 1995, neither has arrived.

Do the delays reflect trouble at Quark, or a series of unrelated coincidences? Sources close to Quark allege that shifting priorities, high turnover (for example, only one product manager at Quark has held the position for more than two years), and low morale are hurting the company's efforts. Quark's president, Fred Ebrahimi, disagrees; he claims a record profit in 1995 and a 25 percent increase in worldwide XPress sales, as well as low turnover in research, programming, and product management. He also cites a new commitment to improved customer support. Sources paint a darker picture of a Quark stressed by inconsistent management and shifting priorities.

Xposure: Grim Prognosis

Groomed by Quark as a Photoshop killer and first shown in prototype form over a year ago, QuarkXposure generated much excitement among artists and publishers.

But Xposure has yet to ship, or even go into beta testing. A joint project between Quark and JVC, a Japanese company that has not previously brought a Mac product to market, Xposure faces serious technical problems, says Ebrahimi, who admitted that "it's not in a condition I would consider shipping." While hoping for a solution, Ebrahimi says, "We didn't do the R&D work. We have no control over the [core] technology." He said Quark will decide "in the next few months" if Xposure can be fixed to Quark's satisfaction and that the product has "about a 50-50 chance" of survival.

The picture actually looks much bleaker, according to knowledgeable sources who say that conflicts between the two companies over JVC's refusal to correct serious performance and interface problems have effectively derailed the project. (JVC would not comment.) As a result, Quark's Xposure design team has been reduced to a skeleton crew, these sources say. Ebrahimi would not comment on staffing.

Sources say that an agreement letting Quark use PixelCraft's color-separation architecture in Xposure also fell through late last year. Neither Quark nor PixelCraft would comment on this allegation.

Immedia: Should Ship This Year Quark's multimedia XTension, Immedia, is in much better shape. The company says Immedia will be out by summer; beta testing is expected to begin by late February.

Immedia is taking a different approach to multimedia publishing than programs like Adobe's PageMill, eschewing Internet standards such as HTML in favor of Quark's own browser, which would work as a stand-alone viewer or as a plug-in for Web browsers like Netscape Navigator. Ebrahimi says Immedia is designed to deliver documents that have layout, typography, video, and sound, and that HTML and other Web-publishing technologies simply can't produce such design-oriented documents.



XPress: Not Top Priority The status of XPress 4.0 is less clear. Last spring, Quark chairman Tim Gill described an initial features list at the QuarkXPress Conference and said that 4.0 would ship toward the end of 1995 (see *Graphics* news, August 1995). Ebrahimi says Quark has no schedule for XPress 4.0. He would like it to ship this year, but "it's fine with us if it ships next year."

That's because the priority project at Quark right now is Immedia, which he believes will broaden Quark's business.

A Future Assured? Quark clearly feels its superior technology will maintain its edge over competitors in the long haul. But can a one-product company turn into a successful multiproduct entity, given Quark's reputation for being difficult and its dependence on one man—Gill—as the visionary and primary architect of its key technologies?

"APPLE'S NEW CHIEF"

continued from page 39

more licensees than Power Computing and Umax—to serve the low-profit markets may spell an end to or significant reduction in the Per-forma line.

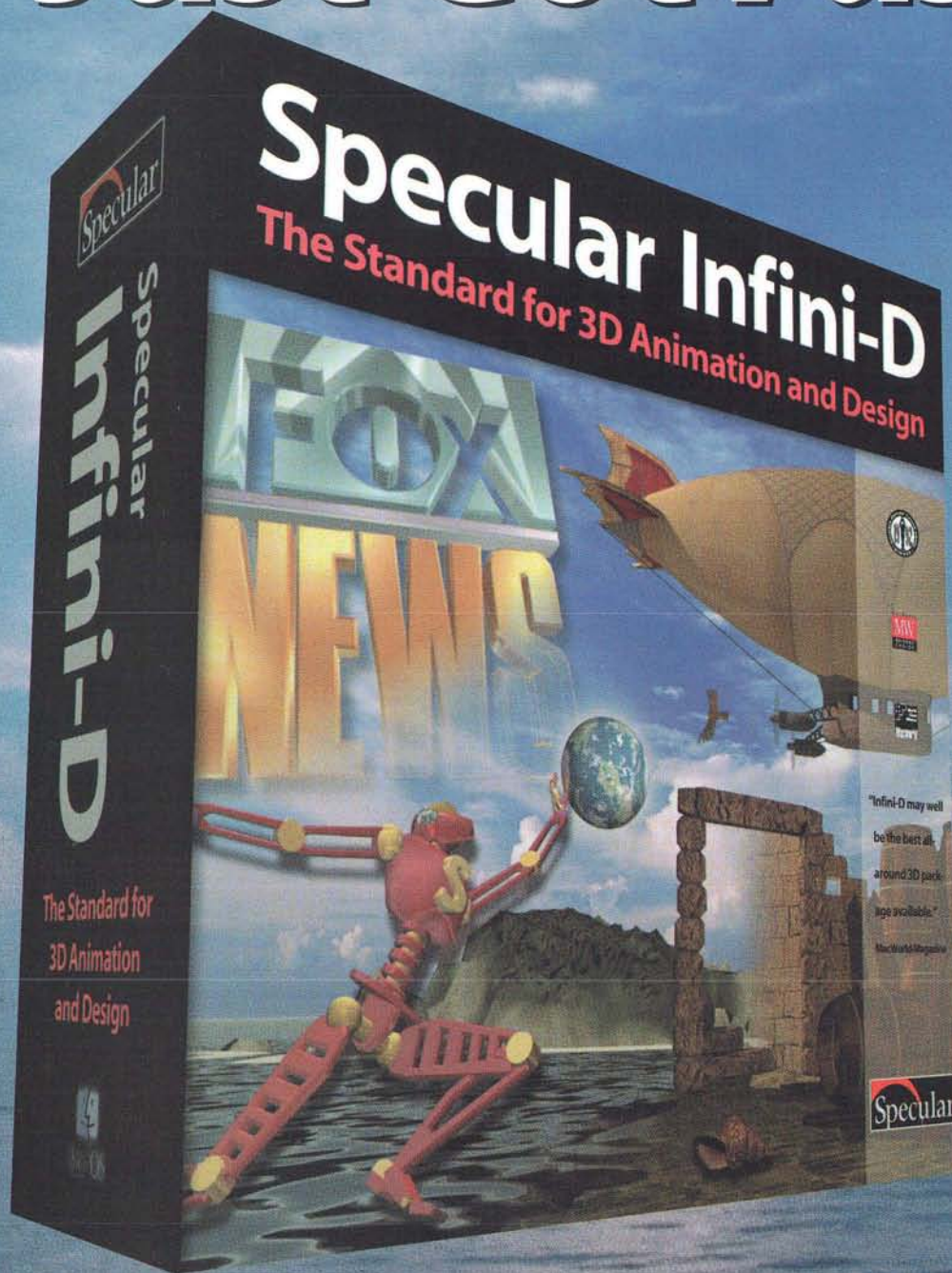
In recent months, Apple has already begun shedding several projects, including the Kaleida multimedia scripting-language project and the Taligent user-interface/development-environment project, both done jointly with IBM; the Dylan project to develop a scripting language for the Mac similar to Microsoft's successful Visual Basic for Applications on Windows; and most recently PowerTalk, an E-mail services technology.

And Apple is now showing the public some of the progress the company has made in the development of the Copland OS, to calm fears that this major effort has been sidetracked (see "Copland's New Abilities," in this section). But Copland managers also say Apple is willing to drop some features in the first Copland release if that's what it takes to ship Copland by spring 1997. One delayed feature could be the planned simplification of the System Folder, say these managers. Another delayed technology may be Copland's implementation of QuickDraw GX, say sources at Apple.

According to David Nagel, Apple's research chief, Apple has picked three technologies to form the basis of the company's future: Copland, the Newton personal-digital-assistant technology, and the Pippin game-player/Internet-surfer system.

Additional reporting by CAMERON CROTTY and CHARLES PILLER. For the latest on Apple's restructuring, see *Macworld's* online coverage at <http://www.macworld.com>.

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New Products

THE LATEST MACINTOSH RELEASES

COMMUNICATIONS

28.8 Modems for All

Everyone wants a 28.8-Kbps modem for online and Internet access. U.S. Robotics (708/676-7010) now offers these fast modems for desktop and notebook Mac owners along with fax software and an Internet connection kit. For the desktop, U.S. Robotics has the \$279 Sportster 28.8 Fax-modem and the \$329 Sportster Voice 28.8 Faxmodem (it includes a speakerphone, voice mail, and call logging), both of which support the new 33.6-Kbps extension to the 28.8-Kbps V.34 standard. The company also offers the \$329, 28.8 PC Card for Mac, which fits in the new 5300-series and 190-series PowerBooks' PC card slots.

Fax That Server

Global Village Communication (408/523-1000) has added fax-receiving capability to its \$2099 OneWorld Combo and \$1499 OneWorld Fax telecommunications network servers. The upgrade is \$99.

DISPLAY

Colorful Monitors

Monitor makers constantly refine their displays and thus always seem to have a new model available. Here are some of the latest crop. (Note that you'll have to buy a Mac adapter separately; it costs about \$30.)

- Corion Industrial (408/980-8988) has introduced its ArtMedia monitors, which come in 14-, 15-, 17-, and 20-inch models. All use Trinitron tubes. They are expected to ship by July.

- Orchestra MultiSystems (714/891-3861) offers the \$629, 17-inch Tuba II and the \$429, 15-inch French Horn II monitors.

- Sampo Technology (770/449-6220) has the \$949, 17-inch AlphaScan 760.

- Smile International (714/546-0336) is shipping the \$720, 17-inch CA1716SL and the \$420, 15-inch CA1516SL.



Smile CA1716SL

- Techmedia Computer Systems (714/379-6677) is shipping the TCM-1750, a 17-inch monitor that costs \$699.

PCI Video Cards

Itching to use one of the PCI slots in your new Power Mac? Consider Integrated Micro Solutions' (408/369-8282) TwinTurbo-128M2 video-display card. The card accepts standard Mac VRAM SIMMs to increase the card's standard 2MB of video RAM to 4MB. The \$399 card also has built-in QuickDraw acceleration for movie playback.

Meanwhile, Micro Conversions (817/468-9922, mcimktg@onramp.net) will ship two low-cost PCI video cards in March: the \$319 1324PCI with 1MB of VRAM and the \$375 1724PCI with 2MB of VRAM.

EDUCATION

Multimedia Design Courses

Peachpit Press (510/548-4393) has released four CD-ROMs that teach professional graphics and multimedia production skills. The three Color-

Course CDs—Photography, Illustration, and Imagesetting—cost \$50 each; the Mac-Graphics Interactive Workshop costs \$80.

Reading, 'Riting, and 'Rithmetic

Written by teachers, the \$149 nine-course Elementary Science and Math Software CD from HyperTech Media (301/447-1689) covers weather, buoyancy, insects, seeds, plant growth, acid rain, food chains, ecological balance, and math. The company also offers two CDs aimed at teaching young children how to read and write: Old Turtle, and Alexandra, Keeper of Dreams, both based on popular books of the same names. They cost \$49 each (\$69 bundled).

Make Your Own Music

Voyager (212/431-5199) has released Making Music, a \$40 CD that teaches children ages five and up how to make music.

GRAPHICS

Automated Image Conversion

binuscan (212/681-0600) has enhanced its \$1950 ColorPro software with the ability to convert RGB images automatically to black and white. The program works in the background, color-correcting and sharpening the image before converting it. The program also performs CMYK separations and Photo CD conversions.

Stretch That Image

The Valis Group's (415/435-5404, valisgroup@aol.com) \$199 Flo' 2.5



Flo' 2.5

lets you work with an image as if it were on a rubber canvas that you can stretch. The Flo' package includes a stand-alone version and a Photoshop plug-in.

CAD Improvements

Bentley Systems (610/458-5000) has revised its MicroStation V5 CAD software. The new MicroStation 95 costs \$3950, with upgrades from V5 priced at \$475. The product runs on Power Mac systems; several Unix workstations; Windows NT, 95, and 3.1 systems; and OS/2 systems.

Meanwhile, Ashlar (408/746-1810) has introduced DrawingBoard, a \$250 cross-platform CAD program aimed at nonprofessionals doing home and landscape remodeling.

Packaged Artwork Galore

Dozens of companies offer clip art, stock photos, and model libraries. Here are some of the latest offerings.

- Replica Technology (716/337-0621) offers five interior-design-oriented collections of 3-D objects for use in Infini-D, as well as five for Strata StudioPro. Prices range from \$65 to \$129.

- Image Club (403/262-8008, imageclub@aol.com) has the \$99 Sketches on the Town collection of nighttime entertainment images and the \$99 Businessville conceptual business images.

- The Stock Market (212/684-7878) has a second volume of stock images; reproduction prices vary based on how an image is used. Meanwhile, Index Stock Photography (212/929-4644, info@indexstock.com) has put some of its images on its World Wide Web site (<http://www.indexstock.com>); to get the full-resolution image for personal use, you fill out an E-mail form.

- T/Maker (415/962-0195) has released the ClickArt Express series, which contains 16 titles that cost \$15 each and offer 100 to 200 images each. Titles range from Framers & Bursts to Real Estate.

- FoodPix (310/837-9900, foodpix@aol.com) is the first stock-continues

New Products

image agency devoted to food-related images. There are over 1900 images in its first CD. Reproduction prices vary.

INPUT DEVICES

Bar-Code Reader

Percom (503/344-1189) has introduced the \$249 Bar Code EasyWand, an ADB-based reader wand and software-based decoder.

MULTIMEDIA

Learn 3-D Animation

Electric Image (818/577-1627, electric.img@applelink.apple.com) is shipping the ElectricImage Scholastic Edition, a \$795 subset of the company's 3-D-animation software aimed at students. The company also recently released version 2.5.2 of the \$7495 full ElectricImage as a free upgrade to version 2.5 owners.

Speedy CDs

Toshiba America (714/457-0777) has introduced the XM-3701 series of 6.7-speed CD-ROM drives. They also support 1x and 2x speeds. Internal drives cost \$415, external drives \$515.

NETWORKING

More Ways to Communicate

Stalk Software (415/383-7164, sales@stalker.com) has added three messaging modules for its CommuniGate integrated-messaging platform: SMTPGate for Internet mail, PaperGate for wireless paging, and PrintGate for routing E-mail and faxes to a local printer. Prices vary based on the number of users.

Network Backup

Legato Systems (415/812-6000) has announced ClientPak for Macintosh, a \$1500 network-backup program that lets users recover data without administrator intervention.

PRINTING

Color Laser Choices

As color laser technology gets more affordable, more companies will offer it. QMS (334/633-4300) is the latest entrant, with three choices: the \$5799 magicolor CX/8 (with 8MB of RAM and 300-dpi color output), the \$6499 magicolor CX/20 (with 20MB of RAM and 600-dpi color output), and the \$7999 magicolor CX/32 (with 32MB of RAM and 600-dpi color output). All three models support 600-dpi black-and-white output.

Richer Color Inks

Graphic Utilities (408/577-0334) is offering pigment-based ink-refill cartridges for Hewlett-Packard ink-jet printers. The use of pigments, rather than standard dyes, should make colors richer.

PUBLISHING

Consistent Color Gets Closer

To help designers and publishers get consistent color, several companies are offering help.

- Praxisoft (703/729-3391, praxisoft@aol.com) has released the \$129 Color Compass 1.1, which lets you create colors that you can use across programs. It also supports ColorSync for consistent printing. The company has a \$100 version that works as a plug-in for QuarkXPress.
- Lasergraphics (714/753-8252) has released its \$895 FullCircle closed-loop color-calibration software. It requires use of a Lasergraphics film recorder.
- NewGen Systems (714/641-8600) has released the \$16,995 ChromaPro Color Proofer, a PostScript-compatible dye-sublimation printer with built-in color-management controls.

Working with Fonts

Fonts are like potato chips: you always want more. Monotype Typography (312/855-1440) has released version 5.0 of its \$50, 4100-

font CD collection. You pay for individual fonts as you unlock them.

And if you're looking for something different, consider the \$50 Magick & Mystick set of symbol and talisman fonts from Denart Systems (416/941-0919).

STORAGE

Ever Cheaper Capacity

Quantum (408/894-4000) plans to begin shipping in March 1996 two 3.5-inch high-capacity internal hard drives: the \$395, 2.3GB Sirocco and the \$265, 1.6GB Sirocco. Yes, you read this right, but note that these prices are what Quantum charges resellers, so store prices will be 20 to 40 percent higher.



Quantum Sirocco Drive

TITLES

Insider's Guide

Want to know as much as a *Macworld* editor about the computer industry? Check out *PC Roadkill*, a \$20 book by Michael Hyman from *Macworld's* sibling company IDG Books Worldwide (800/434-3422).

The World on Your Desktop

The powerful imagery of Earth as seen from satellites is now available on CD-ROM. Now What Software (415/885-1689) offers *Earthscapes in Time*, a \$50 CD that shows how the



Earthscapes in Time

Earth has evolved. And Rocky Mountain Digital Peeks (303/258-3779) offers the \$39 Earth Observatory, which is based on a space shuttle's Earth observations.

Healthy Computing

As computers have become popular, it's clear they can be misused in ways that lead to health problems. Two new books try to prevent such problems: O'Reilly & Associates' (707/829-0515) \$22 *The Computer User's Survival Guide*, by Joan Stigliani, and Prentice-Hall's (800/382-3419) \$19 *Compute in Comfort*, by Paul Linden.

Internet Guides

Looking to get on the Internet but don't know where to go once you're there? IDG Books Worldwide (800/434-3422) offers two guidebooks: the \$40 *Internet Yellow Pages 1996 Edition*, edited by Gregory B. Newby (how ironically he's named!), and the \$20, *60 Minute Guide to the Internet*, by Andrew Kantor.

UTILITIES/TOOLS

Virus Protection

S&S Software International (617/273-7400, info@drsolomon.com) has released Dr. Solomon's Anti-Virus Toolkit, a \$99 utility that detects and deletes viruses.

CD-ROM Drives' Best Friend

FWB (415/325-4392; info@fwb.com) has revised its CD-ROM Toolkit, boasting a new interface. Version 2.0 costs \$79; upgrades cost \$29.

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Circle 100 on reader service card

Reviews

Adobe Illustrator 6.0

NEW TWEAKS NOT ENOUGH
TO SURPASS FREEHAND 5.5

DON'T LET THE VERSION NUMBER fool you: Adobe Illustrator 6.0 is not a dramatic upgrade. In fact, it may be the least substantial full upgrade in Illustrator history. The core program remains virtually unchanged since version 5.5, with modifications restricted almost exclusively to plug-ins. Even so, if you're a true-blue Illustrator user who'd rather eat rocks than switch to Macromedia FreeHand 5.5, then you'll want to upgrade to Illustrator 6 as soon as possible. The enhancements are few in number, but they eliminate many of the headaches associated with previous versions.

Except for a minor gradient hiccup in version 5, printing from Illustrator has always been extremely reliable; now it's easier to use. You can print color separations directly from Illustrator 6 without resorting to the Separator utility. If you encounter PostScript errors (such as limitcheck), you can convert gradients into blends, and tile patterns into objects, using the new Expand command. These enhancements are hardly exciting—in a perfect world, Illustrator would have always offered such options—but they make printing less of a nuisance.

TIFFs Were Meant to Be Tagged

In 1988, FreeHand 2.0 introduced support for TIFF images. More than seven years later, Illustrator follows suit. In fact,



HANK OSUNA

Illustrator has gone positively nuts in the compatibility department, importing or exporting a total of 15 file formats, including Kodak Photo CD, JPEG, and flattened Adobe Photoshop 3 images. Best of all, Illustrator 6 includes a new EPS parser that lets you open drawings created in FreeHand and other programs. I was able to open every illustration I tried, including a few that contained imported images and custom PostScript fill patterns. Only text proved a problem, sometimes breaking into hundreds of separate blocks.

But while Illustrator's TIFF support

comes as welcome news, its implementation suffers. Where FreeHand wisely tags TIFF files on disk—the *T* in TIFF stands for *tagged*, after all—Illustrator imports every pixel and converts the image into its internal PostScript format. This means more work for Illustrator and more waiting for you. For example, I imported two Photo CD images into both FreeHand 5.5 and Illustrator 6. In FreeHand, it took a few seconds to import the images, and the completed illustration consumed 33K on disk. In Illustrator, it took a whopping 14 minutes to import the images, and the finished illustration consumed 44MB—

RATINGS

Outstanding ★★★★★ = 9.0–10.0

Very Good ★★★★ = 7.0–8.9

Good ★★★ = 5.0–6.9

Flawed ★★ = 3.0–4.9

Unacceptable ★ = 0–2.9

more than 1000 times the drive space that the FreeHand file took.

FreeHand speeds up screen redraw by letting you control the on-screen resolution of an imported TIFF image, making screen redraw nearly instantaneous; Illustrator lacks image-redraw controls and at times is unbearably slow. On the other hand, Illustrator wisely tags EPS images on disk and imports just the PICT preview, so if you want to import large images, you're better off sticking with the EPS format, just like in the old days.

Illustrator and Photoshop

Since the overwhelming majority of Illustrator artists also use Photoshop, Adobe has built a virtual bridge between the two. You can now drag objects from Illustrator and drop them into Photoshop. Photoshop rasterizes the objects on the fly according to the resolution of the image window, so higher resolutions yield more pixels. You can likewise drag images from Photoshop into Illustrator, but only at 72 dpi. You need System 7.5 and lots of RAM (at least 32MB) to take advantage of drag and drop, but to its credit, Illustrator relies on the Mac's native drag-and-drop functions, rather than infesting your system with Microsoft OLE (as its sibling Adobe PageMaker does).

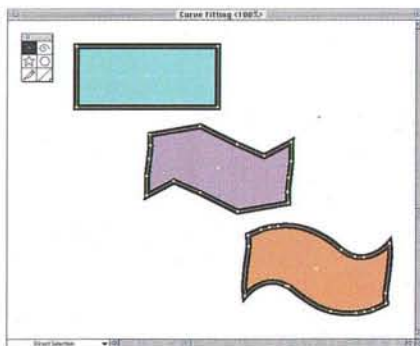
You can also rasterize objects directly within Illustrator, lift colors from pixels using the eyedropper, and apply Photoshop-compatible filters to imported images. Illustrator supports a wider range of Photoshop filters than FreeHand does, including the external filters that ship with Photoshop. The one caveat is that you cannot apply a filter to a tagged EPS image, so you have two choices: either import an image in its entirety and retain the option to filter it, or tag the EPS file on disk and do without filters. There is no need for such a trade-off in FreeHand.

Plug-ins Come of Age

In version 5, Adobe opened up Illustrator to third-party plug-ins. To get the ball rolling, Adobe threw in a few plug-ins of its own. Illustrator 6 expands plug-ins, permitting them to appear as commands or tools. Where you once had to choose commands and enter numerical data to create polygons, stars, and spirals, you can now drag with tools. Illustrator equips the tools with lots of keyboard tricks, allowing you to add sides to a polygon or modify the twist of a spiral as you draw the

shape. These are some of the best tools for creating primitives (simple shapes) that I've seen.

Version 6 also adds curve fitting, which lets Illustrator distort paths accurately. For example, where the old Twirl filter merely moved points around, the new Twirl command adds points intel-



Distortions Done Right The orange shape is the result of applying Illustrator 6's new Twirl tool to the blue rectangle; the purple shape shows the less-desirable results of Illustrator 5's Twirl filter. Thanks to curve fitting, Illustrator 6 is able to add points and bend the segment where needed.

ligently and bends segments with mathematical precision (see "Distortions Done Right"). Only a handful of Illustrator's commands take advantage of the new curve fitting, but this feature should be a boon to third-party plug-in developers that do not include curve-fitting capabilities of their own.

Other plug-in improvements include a floating palette of alignment and distribution options and a Control palette for quickly moving, scaling, and rotating whole objects. A new Path Pattern filter lets you apply specially constructed tile patterns to the stroke of a path. Illustrator can stretch and bend the tiles (again using curve fitting) so that the tiles follow a path's twists and turns like diamonds along the back of a rattlesnake.

The knife function—implemented both as a tool and a command—is the rotten apple in the new crop of plug-ins. Designed to create free-form slices through filled objects, it seems to have missed the testing cycle. The knife has a habit of deleting unfilled paths, particularly closed ones. You can spare unfilled paths by pressing the control key, but this essential trick goes undocumented. And a documented technique for duplicating sliced paths by double-clicking on the knife tool icon doesn't work.

FreeHand Stands Tall

When all is said and done, FreeHand 5.5 retains a few key advantages, especially in the realm of blends. Illustrator's reliance on a tool instead of a command makes blending more cumbersome than it should be; the blend function is notorious for generating errors if you don't click according to rigid specifications; and Illustrator can't redraw blends when you move, edit, or recolor shapes.

Illustrator's autotracing function is similarly inferior. Despite Illustrator 6's support for a multitude of image formats, black-and-white tracing templates are limited to PICT or MacPaint formats. You can't adjust the template after importing it, and Illustrator can trace only one path at a time.

FreeHand also continues to be the faster program, especially where text and imported images are concerned. FreeHand lets you mix page sizes in one document, automatically advance from one page to the next, and zoom and scroll with far more precision. And perhaps most important, only FreeHand 5.5 exists on both platforms. Illustrator for Windows has stalled at version 4.1, essentially the equivalent of Illustrator 3 for the Mac.

The Last Word

Illustrator does offer its share of advantages. Even FreeHand devotees admit Illustrator's pen tool is a work of art. Illustrator also provides better gradients, masking, guidelines, and transformation capabilities in addition to shape-creation tools, curve fitting, and Photoshop support. But the plain fact is that FreeHand has made more substantial progress than Illustrator in the last two years and looks poised to continue moving aggressively into Illustrator's territory. If FreeHand doesn't interest you, then the changes in Illustrator 6 justify the \$99 upgrade cost. But if you're on the edge, give FreeHand 5.5 a serious look before making your decision.—DEKE MCCLELLAND

RATING: ★★★★★/7.1 **PROS:** Improved file-import capabilities; drag and drop between Illustrator and Photoshop; supports Photoshop-compatible filters; revised shape-creation tools; curve fitting for better distortions. **CONS:** Inefficient image handling; clumsy blending and tracing; knife tool has problems. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** \$595.

FileMaker Pro 3.0

DATABASE FAVORITE GOES RELATIONAL, WORKS THE WEB

FILEMAKER PRO HAS DEVELOPED an outstanding reputation over the years as a database for mere mortals, not just programmers. Year after year, it has scored well with end users, more on the strength of its usability than on its power. Building on this legacy, FileMaker Pro 3.0 offers improved ease of use and a power boost while maintaining its reasonable price.

Learning to Relate

The simplest database is a two-dimensional table, much like a spreadsheet. The simplest sort of *relational* capability is to look up data in one of these tables and add it to another table. In a relational link, two columns with the same information in two different tables—a column of Social Security numbers that appears in a table of employee salaries and in a table of employee home addresses, for example—are used as the lookup connection between the tables. With clever design, you can arrange a relational database to contain little redundant information (for example, storing address data in only one place), so that large multitable business databases become much more compact than they would be if everything were stored in a single table.

Earlier versions of FileMaker could perform a limited type of relational lookup; 3.0 is a fully relational database, supporting both one-to-one and one-to-many links, a dramatic improvement for users with more challenging database needs. To implement table linking, FileMaker Pro 3.0 uses a spartan dialog box rather than the fancy graphical mapping found in competing packages, but it works well enough for the typical small-business environment.

The Big Easy

The new relational capabilities are great for FileMaker developers, who usually generate the most complex FileMaker applications. But for nonprogrammer end users looking for easy database solutions, the templates provided on CD-ROM will be the biggest news in this release. A group of 23 business templates covers everything from asset management to

time cards, with professional-quality expense-control systems, personnel databases, and inventory/accounting software. The 8 education templates run from the obvious (student records) to the adventurous (a nifty Field Trips template), and the 13 home templates include one for



Get What You Want You can set up a product catalog quickly with the appropriate FileMaker template, and with a little script engineering you can make the catalog a Web site.

recipes, a wedding planner, a medical-records keeper, and a check tracker that resembles a mini-Quicken.

You can easily take all of the templates apart and rebuild them to your heart's desire in FileMaker's Layout mode; a first-time user can remake templates into a custom application in a single afternoon using only the information in the built-in tutorial. This sort of simplicity is the main reason for FileMaker Pro's popularity in the Macintosh small-business-database market.

Nothin' but Net

FileMaker Pro 3.0 supports TCP/IP and IPX networking protocols, and includes instructions for using AppleScript to set up your FileMaker database on the World Wide Web. You can use this capability to set up a database of URLs in a sort of special-interest, roll-your-own Yahoo-type site, or use the Product Brochure template and the FileMaker Events URL suite to open your own retail Web site (see "Get What You Want"). Once you have your catalog on the Web, you can easily modify it by adding or deleting records in the traditionally easy FileMaker way.

Limits

FileMaker Pro is aimed at small and medium-size businesses interested in efficient database solutions, and its programming capabilities are limited compared with those in competitors like ACI US's 4th Dimension (see *Reviews*, March 1996), Blyth's Omnis 7, or Microsoft FoxPro. Claris greatly expanded the scripting command set from previous versions, and it's still possible to work wonders with third-party script extenders such as Power Agent. But even with its improved scripting and third-party options, FileMaker's capabilities can't compare with those of a real programming environment that has a proper debugger. FileMaker Pro isn't as fast as competitors at searching large flat files and offers minimal connections to the venerable, large-company world of SQL databases.

The Last Word

Even these few drawbacks pose no great threat to FileMaker's popularity. FileMaker 3.0's developers aimed squarely at the future rather than offering a backward path to legacy data in large corporate databases; as a result, FileMaker Pro delivers a generous assortment of templates and provides a way to put databases on searchable World Wide Web sites. For most small businesses, a fast way to post catalogs and other company information to the Web is a more significant database capability than improved programmability, a C-language interface for code resources, blinding flat-file search speed, or a SQL interpreter. And with FileMaker's price below \$200 and upgrades for \$99, even the smallest enterprise can afford to make the investment.

For the growing midrange of Mac database users—neither simple list-keepers nor users who need Oracle-like high-end capabilities—FileMaker Pro 3.0 is an ideal program. It's easy to learn, easy to use, and provides a comprehensive assortment of tools for common database tasks.—CHARLES SEITER

RATING: ★★★★★/8.2 **PROS:** Large collection of powerful templates; World Wide Web capabilities; easy to learn and use. **CONS:** Minimal SQL connections; slow flat-file searches; limited programming and scripting. **COMPANY:** Claris (408/727-8227, info@claris.com). **COMPANY'S ESTIMATED PRICE:** \$199.

PowerCurve 601/120

APPLE'S POWER MAC 7500 HAS A NEW RIVAL

FRESH ON THE HEELS OF ITS POWERful yet inexpensive PowerWave 604 series, Power Computing has introduced a system that beats Apple's business desktop standard—the Power Macintosh 7500/100—in both performance and price, while offering nearly identical capabilities.

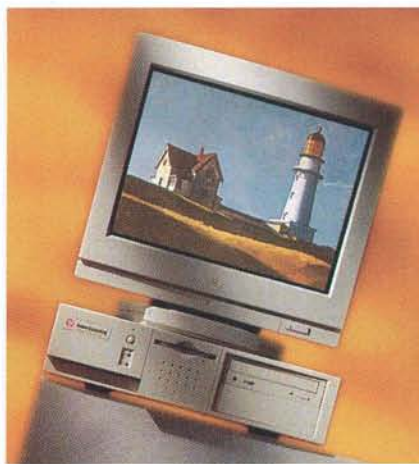
You'll save money buying a PowerCurve, but not *tons* of money. A solid professional-level system should include a 1GB hard drive, 16MB of RAM, a 256K cache card, a 4X CD-ROM drive, 2MB of video RAM, and a keyboard. In this configuration, Apple's 7500/100 costs \$3059 with a third-party extended keyboard, while Power Computing charges \$2777—a savings of \$282. Power Computing skimps a little to give you that savings but also adds a couple of features Apple doesn't offer.

Losses and Gains

Unlike the 7500, the PowerCurve lacks memory interleaving, a design that boosts performance by about 5 percent when two adjacent DIMM slots contain same-capacity, same-speed RAM.

The PowerCurve doesn't offer the 7500's basic video capabilities, either. Most people don't need AV technology, but for those who do, Power Computing offers two solutions: a \$150 Diamond Javelin TV card with low-end video-in and TV-tuner capabilities, or an ATI MM card for the high-end multimedia user. Power Computing will charge \$300 to \$600 for the ATI MM, depending on its configuration.

Some of the initial PowerCurves



ROBERT PENNY

don't offer a power outlet for your monitor. Although I consider this a minor shortcoming, a number of readers complained that I didn't point this out in my review of the PowerWave 604 series (see *Reviews*, February 1996). Power Computing claims that it's fixing this glitch and that all PowerCurves will offer this "convenience outlet" by spring.

Unlike PowerWaves, PowerCurves offer no option to add NuBus cards. Power Computing's \$249 StarGate riser card—which lets you install two NuBus cards and two PCI cards rather than the standard three PCI cards—won't be offered for the PowerCurve.

There's some compensation for these drawbacks, though. Besides the \$282 savings, you get a slightly faster system: Macworld Lab tests show that the PowerCurve is 3 percent faster than the Power Mac 7500/100. As is typical of Power Computing systems, adding PCI cards,

cache, RAM, and VRAM to the PowerCurve is easy, thanks to a case design that's more accessible than the 7500's.

If you're a recent convert and don't have Macintosh software already, you'll find real value in the PowerCurve's bundled applications, which include ClarisWorks 4.0 and other useful extras. You'll also appreciate the videotape that walks you through your new system.

The low-profile PowerCurve case lets you install two internal drives, and one of the bays can handle removable media, just as in the 7500. Power Computing plans to offer a full-size desktop case with four internal drive bays within a few months.

Power Computing says the PowerCurve's CPU is upgradable, and indeed the 120MHz PowerPC 601 comes on a removable card. But the company doesn't yet have Apple's permission to release a faster CPU card based on the PowerPC 604. I tried using the CPU cards from a PowerWave and a Power Mac 8500, but they don't function in the PowerCurve, so you can't get around the uncertainty by betting on today's alternate solutions.

The Last Word

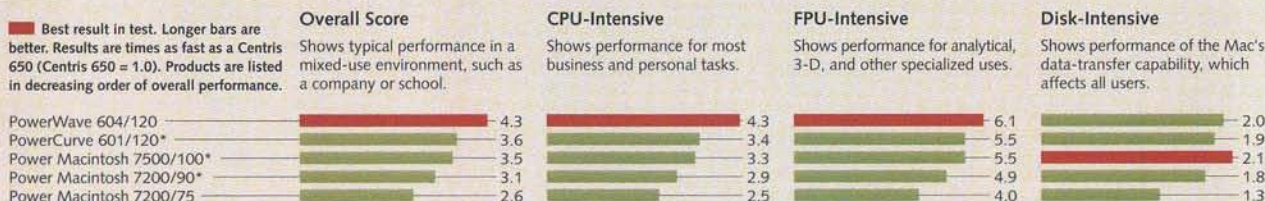
The PowerCurve 601/120 performs as well as any other PCI Power Mac, and for most buyers there's no clear-cut reason to choose one over the other. Buyers who are new to the Mac will like the bundled software, but for the rest of us, it's a toss-up.—GALEN GRUMAN

RATING: ★★★★★/7.5 **PROS:** Fast; moderately priced; accessible case for upgrades; good software bundle. **CONS:** No built-in AV capability; no memory interleaving; cannot use StarGate NuBus bridge. **COMPANY:** Power Computing (512/258-1350, info@powercc.com). **DIRECT PRICE:** Base model \$1849, as tested \$2777.



PowerCurve 601/120—Excellent Speed at a Competitive Price

■ Best result in test. Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in decreasing order of overall performance.



*With optional 256K cache.

For detailed information on how we tested, see "The Best Mac for the Job," *Macworld*, February 1996, page 110.

—Macworld Lab testing supervised by Mark Hurlow

PowerBook Duo 2300c

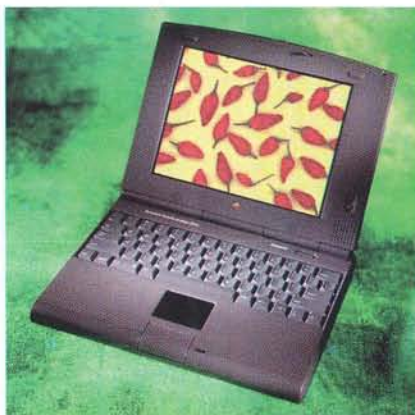
A LITTLE PACKAGE, A LOT OF POWER

THE NEWEST MAC SUBNOTEBOOK, the PowerBook Duo 2300c, would be the perfect accoutrement for James Bond's new BMW Z3 Roadster: fast, sophisticated, and curvy. Although it has the same sleek lines as the 200-series Duo, the 2300c offers a larger screen—9.5 inches to the 200's 8.4—and a touchpad that you can double-click to select items. Still, the 2300c's real allure lies not in its more obvious charms, but in the 100MHz PowerPC chip inside. The megahertz rating is admittedly misleading—it's only a 603e, after all—but this 4.8-pound Mac is as fast as a desktop Power Mac 6100/60.

Portability . . . at a Price

Speed and light weight generally come at a price, however, and this Duo is no exception. The model I reviewed sells for \$4699 and comes with a 14.4-Kbps Express fax modem, 20MB of RAM, and a 1.1GB hard drive—a powerful system, even with the slow modem. (For \$1000 less, you can get a 2300c with 8MB of RAM and a 750MB hard drive.)

That's as expensive as the twice-as-fast Power Mac 8500, and it doesn't include such niceties as spare batteries or docking stations or floppy drives. Of course, you can't balance an 8500 on your knee or tuck it under your arm, but let's face it: this Duo is expensive. A comparable PC subnotebook with a comparable processor (a 75MHz Pentium, 100MHz DX4, or 100MHz 586) runs about \$1000 less than the 2300c.



KEVIN CAUDLAND

Where Your Money Goes

I enjoyed using the 2300c. Its performance is equal to an entry-level business Macintosh's and about 60 percent faster than that of the 280c, previously the top-performing Duo.

With the right assortment of Apple docking stations, the Duo adapts to almost any environment. A \$109 Floppy Adapter lets you attach an external floppy (\$139) or CD-ROM drive (about \$350 from big companies like Apple and NEC Technologies) and an external input device; a dock (Newer Technology's Ultra-Dock with Ethernet is \$510) provides other Mac ports, including those for Ethernet connections and external display. (The 2300c has only a serial port if no dock is attached.)

The 2300c's large, crisp active-matrix screen is easy on the eyes, and the text is quite readable; that extra inch makes a noticeable difference. And even devout

mouse users will find the touchpad easy to adjust to and more natural to use than a TrackPad with a separate button. But I'd forgo the Express modem for an external model, even though that would incur the hassle of providing a power supply—14.4 Kbps simply doesn't cut it for Apple Remote Access, and navigating online services or the Internet is merely adequate at that speed.

The Last Word

The Duo 2300c is a fine subnotebook. Given the poor reception of ultralight portables on the PC side, it's nice that Apple remains committed to its subnotebook line despite the small target market. Yes, the price is high, especially when you begin outfitting the system with docks and peripherals. And yes, I wish there were a simple way to add an infrared port like that in the 5300-series PowerBooks.

Overall, though, the 2300c is a decent system that will appeal to Duo devotees; for them, the 2300c is a no-brainer. (And if you own a 200-series Duo, you can replace the motherboard with the 2300c's Copland-ready, 603e-based board for \$1300.) The rest of us will probably have the same reaction to the 2300c as we had to the BMW Z3: a longing look before we get back into our Volkswagens.—GALEN GRUMAN

RATING: ★★ ★/5.9 **PROS:** Entry-level business-Mac performance in a small, lightweight package; good-size, crisp display. **CONS:** Pricey; requires a variety of add-ons to exchange files and work with peripherals. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** With 8MB of RAM and 750MB hard drive \$3699; with 20MB of RAM, 1.1GB hard drive, and 14.4-Kbps fax modem \$4699.



Duo 2300c Holds Its Own against the 5300

Like the 5300, the newest Duo has a PowerPC 603e with a clock speed that triples that of the 68040 chip it replaces. Also like the 5300, the 2300c barely doubles the 280c's performance since factors like hard-drive speed, video display, and bus architecture diminish the 603e's speed.—Macworld Lab testing supervised by Danny Lee

Longer bars are better. Results are times as fast as a PowerBook 520c (520c = 1.0). Products listed in decreasing order of performance.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
PowerBook 5300	2.3	1.6	8.5	1.4
PowerBook 5300c	2.1	1.5	8.7	1.2
PowerBook 5300cs	2.1	1.4	8.8	1.2
Duo 2300c	2.1	1.4	8.3	1.4
Duo 280c	1.3	1.4	1.4	1.2
PowerBook 190cs	1.3	1.1	1.3	1.7

PhotoDeluxe 1.0

"PHOTOSHOP LITE" MAKES QUESTIONABLE COMPROMISES

THE INCREASED POPULARITY OF low-cost color scanners has created the perfect market for an easy-to-use photo-manipulation application. Now, from Adobe, along comes PhotoDeluxe 1.0, a consumer-oriented image-editing package with a kiosk-style interface designed to hold novices' hands, carefully avoiding Photoshop's legendary learning curve. And unlike its professional-class sibling, PhotoDeluxe comes with a wide variety of templates, photo images, and clip art designed with the consumer in mind.

Keeping It Simple

Like Photoshop, PhotoDeluxe offers filters that can distort, sharpen, scale, and creatively manipulate photographic images; PhotoDeluxe lets you use existing Photoshop-compatible plug-ins, too.

PhotoDeluxe can capture documents directly from desktop scanners using its TWAIN acquire module or a Photoshop-compatible plug-in supplied by the scanner manufacturer; it also imports directly from Apple's QuickTake and Kodak's DC40 digital cameras. More important for small-office users, PhotoDeluxe can import and export a wide variety of formats, including Photoshop, GIF, JPEG, TIFF, PICT, EPS, BMP, and PCX—reason enough to warrant a purchase for some users.

At first glance, PhotoDeluxe's interface looks more like a computer game than that of a digital-image-editing application. When you launch PhotoDeluxe, it hides the Finder and fills the screen with its *own* desktop.

If you're familiar with the basics of image editing, you can work on your own, using traditional menus or a tab metaphor. Novices can use the Guided Activities feature to step through the various image-editing functions (see "At Your Service"). If you're familiar with wizards in Microsoft applications you'll be right at home with this step-by-step process, although Adobe makes it a bit more visually appealing.

Colorful icons help you select creative options. You can quickly frame your favorite photo, or easily transform it into a calendar or greeting card. PhotoDe-

luxe's CD also comes with various templates for creating flyers, signs, and even faux magazine covers.

The Hold Photo feature lets you composite photos, functioning as a sophisticated scrapbook. It can give you seemingly magical powers. Imagine your friends' surprise when Sasquatch crops up in your family portraits!

A Family Resemblance

The PhotoDeluxe design team took an enormous risk in deviating from Apple's rigid user-interface guidelines. For the most part, the colorful, user-friendly style works well, albeit in a cobbled-together manner. But in more than a few situations, PhotoDeluxe's lineage is all too apparent: Photoshop-esque dialog boxes rear their ugly heads when you access many tools. In another application, this



At Your Service Guided Activities walk you through the various steps to edit and manipulate your photo, and incorporate it into a creative project.

sort of code-borrowing wouldn't be as obvious, but these plain-Jane dialog boxes are a sharp contrast to the typically colorful look of PhotoDeluxe's interface. Even more disturbing, the tools still use Photoshop's cryptic methods, complete with terminology sure to confuse users unfamiliar with high-end techniques.

PhotoDeluxe's help system is also far from ideal. Unlike integrated systems in competing packages, the help system is a separate application called QuickHelp. Although the content is thorough, it's definitely not consistent with the graphical nature of the rest of the interface. If Adobe is serious about creating a true consumer-level product, it needs to adopt

a help system targeted to novice users, such as Apple Guide or balloon help. As an addition to QuickHelp, various hints—called clue cards—pop up during the editing process. Seasoned users can disable the clue cards, either individually or as a group. Still, it's a stopgap measure.

Sacrifice Play

Because PhotoDeluxe is geared to the consumer market, Adobe made a number of design compromises to make it usable on the low-powered, low-memory systems typically found in homes and small offices. Most notably, PhotoDeluxe doesn't offer the ability to work with multiple photos simultaneously.

Despite the sacrifices Adobe has made in the name of simplicity, you still need a CD-ROM drive and a 68040 processor to use PhotoDeluxe. And although the documentation recommends a memory partition of 8MB, test files caused the application to crash at this level. Increasing the memory setting to 12MB solved the problem—too bad most existing consumer Macs don't have that much RAM.

Adding insult to injury, PhotoDeluxe's performance is less than ideal on typical consumer-class systems. Some tools and filters are excruciatingly slow.

The Last Word

PhotoDeluxe isn't picture-perfect, but it is a suitable compromise between brute strength and grace. Its suite of tools is easy to use, and its templates are a welcome addition for home users who need a little creative boost.

PhotoDeluxe's low price and fun features make it a logical choice for the home user, but its flaws significantly limit its viability for business use. If you're using Photoshop simply as an import/export tool—and don't need color-separation capabilities or other high-end features—you'll benefit from PhotoDeluxe's lower price.—BLAKE ROBERTS

RATING: ★★/6.3 **PROS:** Low price; easy to use; lots of templates; imports and exports most popular file formats. **CONS:** Cryptic Photoshop-style dialog boxes for some tools; weak help system; only one document can be active at a time; minimum system requirements too high for target market; sluggish performance. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** \$129.

QuickDraw 3D Accelerators

THE MORE YOU SPEND, THE LESS YOU GET

BOY, ARE WE DISAPPOINTED. WITH QuickDraw 3D accelerator manufacturers promising "rendering speeds as high as 12 times faster" than unaccelerated rendering, we had visions of working exclusively with smooth Gouraud-shaded and texture-mapped 3-D models. But despite the hype, we found much more modest performance gains.

In the Lab

To display a 3-D object, your CPU calculates the object's geometry, converts it to triangles, and then rasterizes each triangle. A 3-D accelerator takes over the ras-

support texture mapping, why pay hundreds of dollars for a board that doesn't? Interestingly, combining the Matrox board with Apple's 3-D accelerator board improves rendering quality and restores texture mapping. (For more on the Matrox, watch for *Macworld's* review of PCI graphics cards in an upcoming issue.)

Apple's QuickDraw 3D Accelerator Card offers the lowest price with the best performance. It offered the smoothest images in the least amount of time. It's the only board we tested that supports transparency, constructive solid geometry (CSG), and alpha channels. Note that, unlike the Matrox and Yarc boards,

More-complex 3-D models need the features of an application like Infini-D or Studio Pro. Unfortunately, the more advanced your modeling needs, the less speed improvement 3-D accelerator boards provide. In real-world use, expect to continue working with bounding-box, wire-frame, and flat-shaded renderings. Even Apple's board performs slowly when previewing scenes with more than a few simple models. A 604 PowerPC Mac with QuickDraw 3D software is a better long-term investment. The scheduled spring release of QuickDraw 1.1 should improve 3-D hardware and software performance.

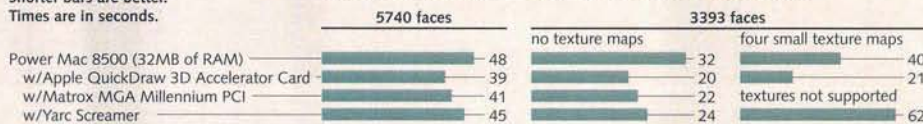
Finally, current 3-D boards don't increase ray-tracing speed or other mathematically demanding tasks. They don't claim to, but you should realize that generating final-quality Phong or ray-traced images for video, film, or print is still a time-consuming process.



Fast on the Draw?

Shorter bars are better.
Times are in seconds.

Time to complete five rotations of a Gouraud-shaded scene



Tests conducted with 3D World 1.0.—Macworld Lab testing supervised by Danny Lee

terization process, freeing your CPU from this time-consuming task. The potential for improvements in performance can be seen using demonstration applications, such as Apple's Gerbils roller-coaster game.

Macworld Lab testing revealed that price and performance are inversely related. The most expensive board, the Yarc Screamer, generated barely noticeable speed gains and actually increased rendering times in our texture-map test. Furthermore, our Mac repeatedly froze during Yarc testing. According to the company, updated drivers and future products will remedy the problem, but for now we can't recommend this board.

The Matrox MGA Millennium PCI (\$649; 514/685-2630)—a QuickDraw 3D accelerator and graphics board—provided a moderate 10 to 20 percent speed improvement in our Gouraud-rendering test for QuickDraw acceleration. But the artifact-filled rendering and the board's inability to display a texture map negate its speed advantage. Since all Power Macs

Apple's board doesn't connect to your monitor. You must still use built-in video or an additional PCI monitor board to drive your monitor. But a single Apple 3-D board can accelerate 3-D rendering to multiple monitors.

Other Reasons to Wait

3D World 1.0 (from Microspot, 408/253-2000), our benchmark application, was built from the ground up around QuickDraw 3D. Heavy-duty 3-D applications Specular Infini-D 3.1 and Strata Studio Pro 1.75+ have features and data structures that these QuickDraw 3D boards don't accelerate. The same *Macworld* model that rotates smoothly in 3D World exhibits jerky motion in Studio Pro and Infini-D. Also, Studio Pro 1.75+ creates 3DMF files (QuickDraw's native file format) that are more complex than they need to be. (Brian Greenstone's shareware 3DMF Optimizer, available on AOL and on Macworld Online's Web site, optimizes complex 3DMF files for maximum speed and minimum size.)

The Last Word

If you have money to burn, consider selling your current machine and buying a 604-based PCI Mac. The 604 provides fast Gouraud shading and texture mapping, even without an accelerator. After you have a PCI Mac, buy 8MB of RAM to cover QuickDraw 3D's added system overhead. If you have money left over and you use Infini-D 3.1 or Studio Pro 1.75+ for hours at a time, consider Apple's board. QuickDraw 3D acceleration promises to improve the way you work with three dimensions. Save your money until it does.—JIM FEELEY AND DANNY LEE

QuickDraw 3D Accelerator Card

RATING: ★★ ★/5.0 **PROS:** Supports texture maps; outputs alpha channel. **CONS:** Minor speed gains with major 3-D applications. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S ESTIMATED PRICE:** \$400.

Yarc Screamer

RATING: ★/1.9 **PROS:** Supports texture maps. **CONS:** Slower than no board in some instances; chokes on simple models. **COMPANY:** Yarc Systems (805/499-9444). **LIST PRICE:** \$995.

Retrospect 3.0, Retrospect Remote 3.0

LEADING MAC BACKUP PROGRAMS NOW EVEN MORE POWERFUL, EASIER TO USE

DANTZ'S RETROSPECT AND ITS NETWORK-AWARE alter ego, Retrospect Remote, have long been the preferred backup programs in the Mac market. The latest version confirms Retrospect's dominance and leaves the competition in the dust.

The earlier versions of Retrospect were powerful but difficult to use. Dantz has resolved that shortcoming in version 3.0, which has a new tabbed-folder user interface that I find much easier to navigate; it lets you begin backing up with as few as three mouse-clicks. Dantz has also done away with the jargon that plagued previous versions of the interface and has rewritten the user manual to include more (and better) examples and tips. As before, Retrospect can use virtually any backup media, from tape drives to disks; now it can also use some recordable CD-ROM units for permanent archiving.

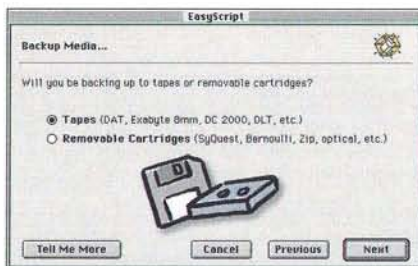
Retrospect 3.0 is single-user, while Retrospect Remote 3.0 adds the ability to back up client Macs to a central Mac over a network. (The base Retrospect Remote can handle 10 clients, with additional Remote Packs available in increments of 5, 10, or 50 users.) Both are Power Mac native, optimized for 604-based Power Macs. Macworld Lab tests show a performance increase of 10 to 15 percent over version 2.1. (Of course, the power of the hardware Retrospect is running on determines backup speed.) On my Power Computing Power 100, local performance was excellent; likewise, using Retrospect Remote, I backed up several client machines over a network with ease.

Although Retrospect is superb at backing up Mac-only installations, it still lacks a Windows client. Dantz expects to release one later this year.

Containers and Scripts

For local desktop and networked backup clients, Retrospect 3.0 uses *containers*, which hold the disk volumes to be backed up. For example, say you have two hard disks and a SyQuest drive attached to your Mac. With previous versions of Retrospect (and with all other Mac backup programs), a script would back up the contents of the SyQuest drive only if the

inserted cartridge was present when the script was created. When you tell Retrospect 3.0 to back up the entire local desktop container, it automatically backs up the hard disks and whatever cartridge is present. The program is smart enough not to back up floppy disks, mounted network volumes, or CD-ROMs (though you can back those up if you like). You can create folders within a container to orga-



When We Say Easy . . . With EasyScript, all you need to do is answer a few simple questions; Retrospect produces a complete backup script for you.

nize its contents, a boon for network managers who need to keep track of dozens or hundreds of remote clients. Managers can now organize remote clients into logical folders by department or any other grouping, rather than deal with a single, unwieldy scrolling list.

Creating backup scripts was difficult in earlier versions; many users simply threw up their hands at the dizzying number of options available. In 3.0, the new EasyScript asks you a few simple questions, then creates a custom script that includes scheduling and media rotation and suggests an offsite backup strategy.

Retrospect's Apple events support is excellent. Scriptwriters can now control virtually every aspect of Retrospect's operations, and Retrospect can trigger scripts. Dantz supplies several sample scripts, including one that works with Ex Machina's Notify to send a message to your pager alerting you that the tape drive contains the wrong tape.

Backup Server

The new Backup Server is reason enough to upgrade to 3.0, especially if you back up many Macs over a network. This special Retrospect script intelligently manages

your backup resources and the computers to be backed up.

After checking to see which backup media are available, Backup Server prioritizes the source volumes to be backed up, with the least recently backed-up disk at the top of the queue. It then polls the local machine and the network to see which source disks are available. Retrospect begins backups at the top of the queue, working its way down the list for however long you set Backup Server to operate. Remote users can request to be backed up as soon as possible, and PowerBook users can be backed up automatically on connecting to the network. Previously, sites with many networked clients couldn't always back up all their Macs in the time allotted (overnight, for example); administrators had to split remote clients into groups for backup on successive nights. The new Backup Server simply backs up as many remote clients as it can in the allotted time, then backs up the remaining clients on successive runs until it has backed up all the clients.

Backup Server is especially useful in conjunction with a multiple-tape DAT loader. This combination gives harried backup administrators maximum flexibility; they can insert tapes from several storage sets into the loader and let Backup Server switch automatically between sets as needed, even using blank tapes when necessary for media rotation.

The Last Word

Backup isn't an exciting subject for most people, and progress in this field tends to be slow and incremental. I commend Dantz for its innovation in creating Backup Server, which adds functions no other Mac backup software can match. There's no better program than Retrospect to safeguard your data.—TOM NEGRINO

RATING: ★★★★★/8.9 **PROS:** Improved interface; better scripting; innovative Backup Server. **CONS:** No Windows client. **COMPANY:** Dantz Development (510/253-3000, sales@dantz.com). **LIST PRICE:** Retrospect \$249; Retrospect Remote (ten users) \$449.

Remote-Access Servers

TWO LOW-END OPTIONS OFFER DIFFERENT STRENGTHS

AS A LONGTIME TELECOMMUTER who helps others do the same, I was happy to review two low-end remote-access servers for small-office telecommuters like myself. Sonic Systems' QuickStream/3 and Tribe Computer Works' TribeLink2 let remote users connect to an Ethernet network over telephone lines using TCP/IP or AppleTalk over PPP (Point-to-Point Protocol). For a charge, these servers also let local users dial out. Beyond these basic similarities, however, the products differ significantly.

These remote-access servers connect a LAN to the outside world through RS-232 serial ports, to which you can attach an asynchronous communications device—a modem or an ISDN terminal adapter (TA)—running at speeds of up to 115.2 Kbps. The QuickStream/3 has three serial ports, and the TribeLink2, two. The TribeLink2 uses plug-in serial interface boards that optionally support built-in V.34 modems or synchronous devices, such as a leased-line Data Service Unit (DSU), at speeds of up to 128 Kbps.

Setting up either device is simple. You install the management software, set serial-port and modem parameters, register users and passwords, and enable AppleTalk and/or TCP/IP. If you use TCP/IP, you assign the server an IP address and set other IP values, such as subnet mask and gateway address. Both companies take pains to explain TCP/IP, but Tribe's explanation is clearer by far. Overall, however, both user guides are excellent.



Web Approach You can manage the TribeLink2 via the Internet using Netscape Navigator.

You need to install PPP client software, which both companies supply, on the Macs that will be dialing in. Although you can use shareware PPP software, the bundled clients are easier to configure and support server-specific features. Sonic provides an unlimited-user client license, while Tribe includes a two-user license.

Unlimited client connections and a lower cost per port on the base unit (\$332 versus \$648) are the main advantages of the QuickStream/3 over the TribeLink2.



The QuickStream/3 (top) and the TribeLink2.

But Tribe's product has a slew of features not found on the QuickStream. For example, Tribe's server is a true IP router, so it can connect entire remote LANs to your LAN (using a remote PPP router or another TribeLink); the QuickStream/3 supports only single-user connections. And the TribeLink's synchronous-port option lets you use synchronous DSUs and ISDN TAs, yielding up to 40 percent higher throughput than asynchronous devices deliver. The TribeLink2 also has AppleTalk-zone and -device filtering, static and dynamic (RIP) IP routing, and a script language for customizing connections with non-Mac remote hosts.

But its most novel feature is WebManage, a built-in World Wide Web server that lets you administer the unit from any computer with Netscape Navigator. WebManage includes built-in documentation. A QuickView page summarizes port status and throughput statistics, and a Status page displays detailed status information, including TCP/IP routing tables, active sockets, and diagnostic logs.

Put to the Test

I connected Motorola BitSurfPro ISDN TAs to each port. Remote Macs dialed in

at 128 Kbps and simultaneously transferred 10MB incompressible JPEG image files. With the QuickStream/3's three ports operating at full speed, throughput dropped well below the maximum 115.2 Kbps—to less than 90 Kbps. The TribeLink2 suffered no such slowdown.

When difficulties arose, Tribe's server provided better problem-solving aids than Sonic's. The QuickStream/3 generates no diagnostic logs—not even error messages—making connection failures very difficult to track down. The QuickStream/3 reported simple problems, such as a password mismatch, with an ambiguous "Connection Failed, -1" message. In contrast, the TribeLink2 provides detailed logging on both ends of the connection, itemizing every step of the process and clearly noting the cause of failures. Unlike the QuickStream/3, the TribeLink2 can disconnect or give the end user a warning when a connection has been left up too long.

The Last Word

If you want to serve a small number of individual remote users and can live with the QuickStream/3's limitations, its lower cost per port may be a reasonable trade-off for features and usability. But if you plan to interconnect branch-office LANs, need true IP routing, or lack a remote technical staff, consider the usability, expandability, and speed of the TribeLink2. Both solutions are welcome additions to the network manager's stable of Mac-savvy products.—MEL BECKMAN

QuickStream/3

RATING: ★★ ★/6.3 **PROS:** Low price per port. **CONS:** No diagnostic logs or messages; performance lags with three heavy users. **COMPANY:** Sonic Systems (408/736-1900, sales@sonicsys.com). **LIST PRICE:** \$995; dial-out option \$249.

TribeLink2

RATING: ★★ ★★/8.2 **PROS:** True IP routing; LAN-to-LAN connections; Web-based administration. **CONS:** High price per port. **COMPANY:** Tribe Computer Works (510/814-3900, sales@tribe.com). **LIST PRICE:** \$1295; dial-out option \$200; additional PPP client licenses \$145 for 10 users to \$1495 for 500.

CommuniGate

INTEGRATED MESSAGING FOR MACS

MACINTOSH USERS TYPICALLY meld together a motley crew of messaging applications—each with a different user interface, address database, and content capability—to send E-mail, faxes, print jobs, and electronic pages. Then the applications won't interoperate unless you spend considerable effort setting up gateways between them. Stalker's CommuniGate software addresses this problem by

The Client

The client is nicely Mac-like, letting you compose messages as styled text, with embedded graphics and sounds. Local recipients using CommuniGator receive messages with multimedia additions intact, but messages that you send via one of the Internet gateways lose all multimedia attributes, because the gateways don't support Multipurpose Internet Mail Extensions (MIME) for multimedia E-mail. Similarly, the software automatically converts attachments to the Mac-standard BinHex format, which is fine if the receiving machine is a Macintosh, but not so fine for non-Mac addressees. CommuniGate doesn't support the Internet-standard enclosure encoding called UUCode, so non-Mac correspondents will find your attachments inconvenient, if not impossible, to read. (For more on sending E-mail enclosures, see *Net-Smart*, elsewhere in this issue.)

The client supports most essential messaging functions: multiple recipients, groups, blind carbon copies, forwarding, and redirecting. Each user can create multiple local mail-

a keycode that enables full functionality. You can send messages to any of the modules directly, using an address that provides a destination pager ID or phone number, the optional service name, and the gateway (12345%*Airnote@PagerGate*, for example). An intergateway routing function transfers messages between gateways, so you can route incoming E-mail to a pager or incoming faxes to a printer. Users can fax from any application via a Chooser extension.

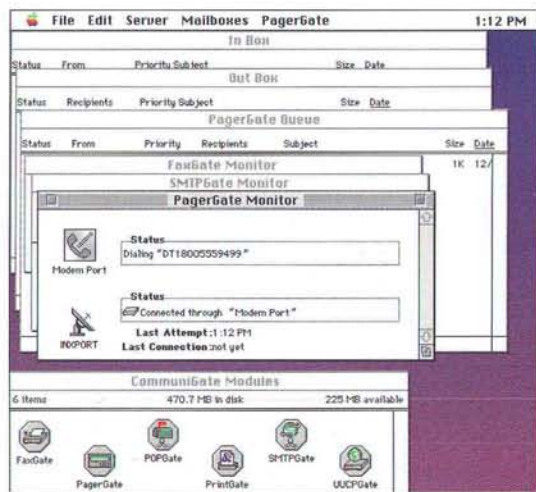
Several miscellaneous features top off CommuniGate's eclectic capabilities. You can create custom fax cover sheets; guest users can read their mail from another user's Mac; and the server stores standard attachment files, making it easy to send boilerplate documents, such as product specs.

Running native on a Power Mac, CommuniGate is fast, both as a server and as a client. Excellent message logging and diagnostics simplify identifying problems.

Pricing has a complicated, à la carte structure. The server and local E-mail gateway with 5 client licenses is free. Each additional 25 licenses cost \$200; an unlimited-user license is \$600. Each gateway costs \$100 and runs only on one server, so running multiple servers (for example, with branch offices) requires purchasing multiple copies.

The Last Word

CommuniGate is priced cheaply enough (free is cheap indeed) that small workgroups can easily afford it, yet its extensible client-server architecture makes it flexible and robust enough to use even in large corporate settings. Stalker has at least one additional gateway module, for voice mail, in the works. If you need a wide range of messaging capabilities, and can live with CommuniGate's limitations, this product is a winner. —MEL BECKMAN



Deliver Pages and Faxes CommuniGate's extensible messaging architecture includes gateways for paging and faxing from any computer with the CommuniGate client.

combining modular gateways with a cohesive client that gives you all this messaging functionality from one interface.

The CommuniGate server software runs in the background as an extension on a local AppleTalk-connected Mac, which must be running all the time. The client software originates and receives messages. The server includes a local-mail gateway, and there are six optional gateways—for POP, SMTP, and UUCode Internet mail protocols, as well as for faxing, printing, and paging.

The CommuniGate software and documentation come on one disk. The documentation is well organized, by function, as separate SimpleText files; but it has no index and suffers from a total lack of illustrations, which makes setup and operating procedures tedious to follow and difficult to perform correctly.

boxes and file incoming mail. A few valuable functions are missing, however: the ability to filter messages based on content; set priorities to make urgent messages more visible; automate replies; and sort related messages by attributes such as date, address, or subject.

Each user can have several address books, as well as access to shared ones on the server. Retrieving addresses is not as easy as it could be: you open the address book and select the recipients, then click on the To button to address your outgoing message. (Claris E-mailer uses a better approach: type a few letters of the recipient's name in the To field, and the closest match appears automatically.)

Heaven's Gateway

The optional gateways operate in demo mode until you buy a module and obtain

RATING: ★★★★★/8.0 **PROS:** Well-integrated modules; multimedia message contents; Internet, fax, print, and pager gateways; intergateway routing; excellent message logging. **CONS:** Incomplete documentation; no message filtering; no MIME or UUCode support; unsophisticated messaging and addressing features. **COMPANY:** Stalker Software (415/383-7164, sales@stalker.com). **LIST PRICE:** Free for 5 users; 25 users \$200; unlimited users \$600; gateway modules \$100 each.

Business Card Scanners

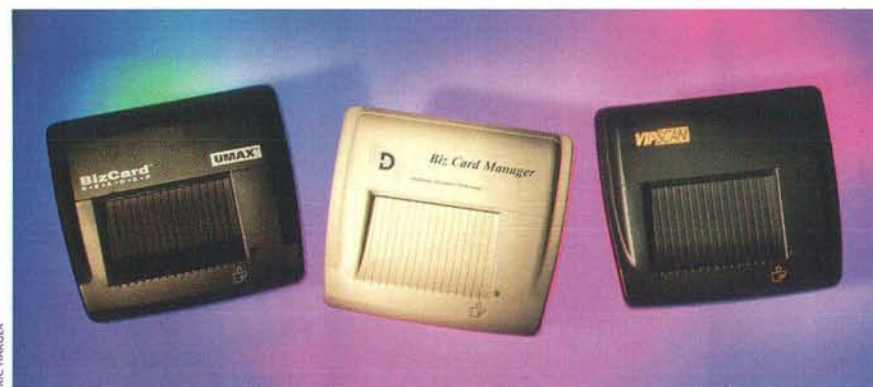
SCANNERS DON'T DELIVER ON PROMISE

MY DESK DRAWERS ARE CONSTANTLY littered with business cards, so I was thrilled when I got to review three scanners—the VIP Scan, Biz Card Reader (BCR), and Biz Card Manager—that would let me transfer card information to my Mac automatically. After trying them for a few weeks, though, I've decided to stick with the old-fashioned method of entering data manually.

Almost Identical

With the exception of a few cosmetic differences and the lack of an on/off switch on the Umax BCR, all three scanners are identical inside and out. An AC adapter

with specialized database applications that resemble contact managers, with fields for names, addresses, phone numbers, and other demographic information. (Two of the scanners—La Cie's VIP Scan and the BCR—even use the same proprietary scanner software.) All three programs let you print and export contact information in a variety of formats. The BCR and the VIP Scan also support automatic data transfer to Now Contact or Symantec's ACT using AppleScript, and La Cie's scanner comes bundled with a copy of Now Contact. (The VIP Scan I tested came with version 3.0; La Cie plans to ship version 3.5 when the current inventory runs out.)



Three business card scanners: the Biz Card Reader from Umax Technologies (left), the Biz Card Manager from Electronic Document Technology (center), and the VIP Scan from La Cie (right).

supplies the power, and a green indicator light on top of each scanner glows when the scanner is on. One particularly annoying feature is the nonstandard SCSI connector, which forces you to use a special (supplied) cable to connect the scanner to your Macintosh. The other end of the cable sports a 25-pin plug that is incompatible with most other SCSI devices. Even with a 25-to-50-pin adapter—and only the BCR ships with one—the scanner has to go at the end of the chain. I also ran into problems getting my Power Macintosh 7500 to work consistently with any of the scanners. Even after I disconnected my only other SCSI device, the scanner software would sometimes recognize the scanner only after I cycled the power off and on.

All the business-card readers come

To scan a card, you place it facedown on top of the scanner and click on a button; you can also set the VIP Scan and BCR to scan automatically as soon as you insert a card. It takes only a few seconds for the card to pass through the scanner and the optical character recognition (OCR) engine to kick in. (All three scanners also support a deferred-recognition mode that lets you scan a series of cards and batch-process them later, but you can still load only one card at a time.)

The OCR software tries to interpret each item of text and insert it into the correct field in the database. Leftover information that can't be classified gets tossed into a separate notes field. After tweaking the scanners' settings for best performance, I tested them with an eclectic assortment of business cards. Not sur-

prisingly, accuracy was highest on cards with plain, clearly separated text. Cards with stylized fonts or with company logos superimposed over text didn't fare nearly as well, and none of the scanners made any sense of a card with yellow text on a dark blue background.

As expected, the BCR and the VIP Scan performed almost identically, taking an average of about 30 seconds to scan and interpret each card. The Biz Card Manager was a little faster, averaging about 26 seconds per card, but it was slightly less accurate than the other two. All three scanners made at least a few mistakes on almost every business card, though, forcing me to proofread the information carefully.

The Last Word

Given the endless variety of card styles in circulation, it's amazing that these scanners work at all. But in the business world, where a single missing letter or misplaced digit can spell disaster, only perfection will do. In the time that it takes to scan a card and make any necessary corrections, you can usually type the information yourself. Without significant improvements to the scanners' optical character recognition software, I can't recommend them.—FRANKLIN TESSLER

Biz Card Manager

RATING: ★★/3.7 **PROS:** Slightly faster than the other card scanners. **CONS:** More expensive; no automatic scanning or data transfer to contact managers; makes more errors. **COMPANY:** Electronic Document Technology (408/733-7309, ops@edti.com). **LIST PRICE:** \$369.

Biz Card Reader

RATING: ★★/3.7 **PROS:** Scans automatically; exports data to contact managers. **CONS:** Nonstandard SCSI connector; no on/off switch. **COMPANY:** Umax Technologies (510/651-8883). **LIST PRICE:** \$245.

VIP Scan

RATING: ★★/3.8 **PROS:** Scans automatically; exports data to contact managers; includes Now Contact. **CONS:** Nonstandard SCSI connector. **COMPANY:** La Cie (503/520-9000). **LIST PRICE:** \$199.

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Up to 14,400 bps fax capability	■	■	■
Voice/fax line sharing	■	■	■
Data comm software	Microphone LT	Microphone LT	Shareware
Serial port enhancer software	■	■	■
CompuServe® Information Manager	■	■	■
Caller ID	■	■	■
5-Year limited warranty	■	■	■
Durable aluminum case	■	■	■
Flash ROM	■	■	■
Alpha-numeric display	■	■	■
Fax software	FAXcilitate	FAXcilitate Lite	GlobalFax
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Circle 83 on reader service card

Tax-Prep Programs

THREE PROGRAMS UNTANGLE KNOTTY TAX LAWS

EVERY YEAR, TAXPAYERS' DREAMS of single-page tax returns that take just minutes to complete seem less and less likely to come true. This year is no exception; you can expect more forms and regulations than ever. If you've decided it's time to switch from the pencil-and-calculator method to software that does the organizing and calculating for you, you have three programs to choose from. They range from the sophisticated MacInTax Deluxe—a CD-ROM complete with built-in help and QuickTime videos—to the practical, no-nonsense Kiplinger TaxCut to the minimalist Personal Tax Edge. (The head-start versions reviewed here let you plan and preview your return, but only the final versions—which aren't generally available until late January—contain the complete set of IRS-approved forms required for filing.)

Despite their divergent interfaces, the programs share some basic features. If you know your way around a tax return, you can enter information directly into electronic tax forms. Each program can also act as a virtual tax preparer, interviewing you and recording the information on worksheets and on the actual return. All the programs check returns for errors and missing information, flag potential trouble spots that could attract an auditor's attention, and offer financial-planning advice. If you need help using the programs, telephone support is available (though tax advice is not). When you're finished, you can either print your completed return and mail it yourself or

send it to the publisher of the program for electronic filing.

All three companies have Web sites that may help you decide on a program or get assistance once you've started preparing your taxes. For more informa-

A Face Only a DOS User Could Love Parsons' Personal Tax Edge comes across as a quick Mac port from the DOS platform.

tion on TaxCut, point your browser at <http://www.conductor.com/>; for Personal Tax Edge, go to <http://www.parsonstech.com/>; and for MacInTax, see <http://www.intuit.com/turbotax>.

Kiplinger TaxCut

Kiplinger TaxCut from Block Financial Software may lack the extensive built-in help resources of MacInTax Deluxe, but its interview process is first-rate. For example, it helps you figure out if you can take a home-office deduction, then holds your hand as you calculate how much you can deduct.

Although the program isn't Power Mac native, TaxCut is speedy enough that you won't be disappointed; however, when I used it on my 80MB Power Mac 9500/120 (with Virtual Memory off) I got a low-memory message and had to allocate a larger partition. More frustrating is the lack of state modules: although you can get Windows versions for more than half the states that tax income, Macintosh users are limited to modules for California and New York. And TaxCut's written documentation is bare-bones; you'll have to rely on the built-in help if you have a problem.

Personal Tax Edge

Parsons Technology's Personal Tax Edge has "fast PC port" written all over it, with unsophisticated graphics and blocky text that bring to mind a low-cost DOS program. *Minimalist* charitably describes the built-in help, and the interview feature isn't terribly comprehensive—it asks some basic questions, then presents you with a tax form and leaves you to complete the form on your own.

Although the interface may put off some users, Personal Tax Edge produces high-quality printed forms comparable to those of the more expensive programs. If your tax returns are simple or you're a master of tax preparation, the lack of extensive built-in assistance won't be a drawback. And Parsons offers a state-tax package for every state that collects income tax, something even TaxCut has yet to offer.

MacInTax Deluxe

MacInTax Deluxe, currently the only CD-ROM-based tax program for the Mac, has enough QuickTime videos and built-in documentation to guide you easily through the complexities of tax forms. (You can also get the guts of the program, minus the extensive built-in help, on disk.) State modules are available for all states that collect taxes.

The MacInTax interview process is a marvel of simplicity. The program presents each question in clear language, and you can click on an underlined phrase to get additional information on that topic. QuickTime videos complement some



A Tax Library at Your Fingertips MacInTax Deluxe offers QuickTime movies with useful tax tips as part of its Navigator interview feature.

questions; you can also click on an icon within the program to get help from IRS tax publications or the two built-in books offered with the program. MacInTax can even calculate your deduction in different ways so you can choose the method that yields the biggest tax break.

MacInTax is loaded with thoughtful

Simple Elegance Kiplinger TaxCut has a handy question-and-answer feature that makes completing your return a breeze.

features; for example, it offers to save your work whenever you move from one topic to another. The only negatives are that previous final versions have shipped late and with bugs, and customer service tends to be scarce as April 15 approaches.

The Last Word

Any of these programs will help you prepare a clean, accurate tax return. If your tax picture is relatively complicated, though, you need software that guides you through the rough spots simply and intelligently. Parsons' Personal Tax Edge yields respectable results but doesn't do much hand-holding along the way; Kiplinger TaxCut, with its easy-to-use interface and elegant organization, has much to offer but lacks a complete set of state versions.

Of the three programs, MacInTax Deluxe is the clear winner; it not only guides you effortlessly through the tax-return minefield but gives you a wealth of helpful advice on financial planning. When it's time to wade through this year's jumble of forms and regulations, that's the program I'll be using.—GENE STEINBERG

Kiplinger TaxCut

RATING: ★★★★★/7.1 **PROS:** Easy-to-use interview feature; well-organized built-in help. **CONS:** Minor memory problems with Power Macs; state versions only for California and New York. **COMPANY:** Block Financial Software (816/751-6000). **LIST PRICE:** \$39.95; state modules \$24.95.

MacInTax Deluxe

RATING: ★★★★★/8.6 **PROS:** Powerful built-in help; simple yet comprehensive interview process; informative QuickTime video help; modules for all states. **CONS:** History of customer-support problems and bugs; somewhat memory-intensive. **COMPANY:** Intuit (520/295-3110). **LIST PRICE:** \$49.95; state modules \$25.

Personal Tax Edge

RATING: ★★★/5.2 **PROS:** Easy to use; high-quality printed forms; modules for all states. **CONS:** DOS-inspired interface; minimal built-in help; memory-hungry. **COMPANY:** Parsons Technology (319/395-9626). **LIST PRICE:** \$19; state modules \$19.

Mediagnügen 1.0.1, ProView 1.1

BARE-BONES TOOLS FOR SIMPLE MULTIMEDIA PRESENTATIONS

TAKE THE CONCEPT OF MULTIMEDIA authoring, strip it to its essence, and you're left with ProView and Mediagnügen. These no-frills tools let you combine graphics, sound, and QuickTime movies into basic interactive presentations, but they lack many of the features needed to produce polished, professional results.

ProView 1.1

ProView lets you create and freely distribute simple, slide-show-style presentations that are either self-running or interactive. It takes almost no time to learn; creating new pages, adding media elements, and creating button links to other pages are simple and intuitive.

Unfortunately, a sparse feature set seriously limits ProView's usefulness. The program supports only PICT and JPEG graphics; you're limited to a palette of 11 colors; you can't import text from other programs; and ProView lacks drawing tools entirely. While the button links make it easy to navigate a presentation, no transitional effects are available; ProView simply cuts abruptly from page to page. (E-magine promises to fix many of these problems in the next release.)

Finally, ProView is prone to lockups and crashes when individual pages contain multiple PICT images. ProView documents with embedded QuickTime movies also cause the application to crash.

Mediagnügen 1.0.1

Mediagnügen is even more limited than ProView. Although the documentation says the program can be used for electronic presentations and slide shows, Mediagnügen is essentially just a multimedia browser. It lets you load and view any combination of graphics and QuickTime movies; you can also import sounds and listen to them within the browser.

One of Mediagnügen's functions is to create catalogs of up to 13,000 files. You can catalog a CD-ROM of clip art, for example, then view thumbnails of the images without rereading each one from the CD.

Mediagnügen is riddled with problems, however. The program supports PICT and JPEG images, but not TIFF, GIF, EPS, or Photo CD files; browsing

tools are extremely limited; you can sort items only by name, not by size or type; and you can't add notes to images. (Gnügen says a future version will support additional file formats and search criteria.) The main viewing interface is awkward, and the documentation consists of a single sheet of paper. Even worse, in a catalog you can't add or remove an individual file, nor can you shift-click multiple images to copy them to an archive.



On Stage Buttons below the Mediagnügen "stage" let you move from image to image, copy images to a new catalog, or run a slide show.

The Last Word

While ProView is a cheap, simple way to create a self-contained, self-running app, Mediagnügen is almost useless as a browser; it lets you view and copy image collections, but doesn't give you the tools to organize and sort them. Even at under \$30, it isn't all that useful.—JOSEPH SCHORR

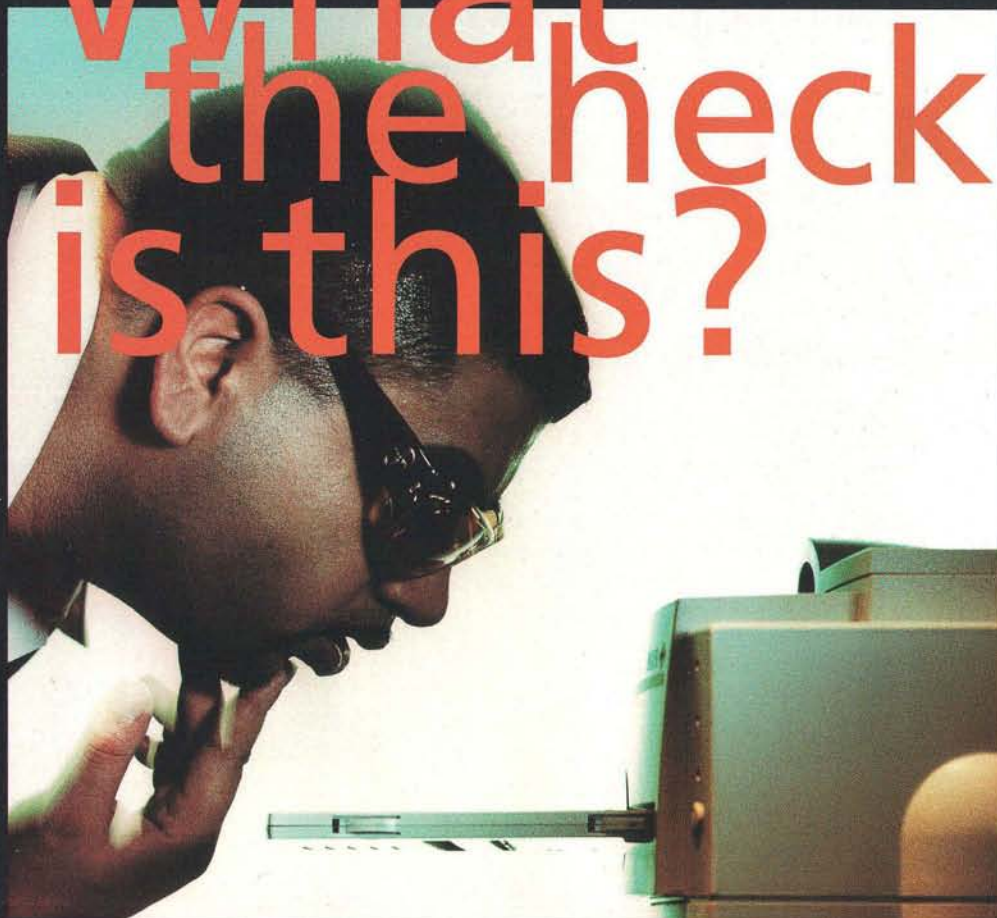
ProView 1.1

RATING: ★★/4.0 **PROS:** Simple to use; includes viewer application. **CONS:** Can't import text; no drawing tools; supports few file formats and colors; occasionally unstable. **COMPANY:** E-magine (818/881-4757, e-magine@panix.com). **LIST PRICE:** \$69.95.

Mediagnügen 1.0.1

RATING: ★★/3.5 **PROS:** Can put 13,000 images in each catalog. **CONS:** Supports only PICT and JPEG formats; can't sort images by size, type, or keyword; can't add or remove individual files; poor interface design. **COMPANY:** Gnügen Software (303/682-5380). **LIST PRICE:** \$29.98.

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KPT Final Effects 3.0

SUPERB EFFECTS LIBRARY FOR
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METATOOLS' KPT FINAL EFFECTS 3.0 is a library of plug-in modules that adds 28 film-quality effects to Adobe After Effects, one of the digital-video world's favorite effects programs (see *Reviews*, March 1996). Final Effects taps directly into After Effects' video-altering engine and adds new effects and transitions to After Effects' Filter menu.

The Final Effects library breaks down into eight categories: distortion, channel, image control, light, particle, perspective, stylize, and transition. The seven distortion filters let you, among other things, slant movies or images, create slanted drop shadows, cut an image into animated squares, and create a vortex effect. Several image-control and channel filters make it easier to create image masks; they also let you composite two images in a single layer, something After Effects can't do on its own.

Final Effects also adds several new transitions, including a gorgeous 3-D page peel (see "Video with a Peel"), two types of wipes, and Twister, in which an image twists as if it's being wrung out. New filters in-



Video with a Peel The Page Turn filter creates gorgeous page-peel transitions. As with all Final Effects plug-ins, you can fine-tune the transitions' characteristics in After Effects' Effect Controls window.

clude Sphere, which projects an image onto a sphere whose surface properties and illumination you control; Scatterize, which creates an exploding image; and Kaleida, which reflects an image for a kaleidoscope effect.

In the particle system, nine filters create everything from starbursts and bubbles to rain and flames. You have full control over the particles' attributes: how often new particles spew from a source, their size, when they disappear, how their colors change over time, and more.

Unlike some third-party effects plug-ins, the Final Effects filters are tightly integrated into After Effects. You can animate

the effects over time by creating keyframes in After Effects' Timeline window; with the Rain particle generator, for example, you can create a gentle drizzle that gradually turns into a windblown downpour. You adjust filter settings in After Effects' Timeline window or its new Effect Controls window.

The plug-ins' rendering quality won't disappoint After Effects veterans. Clips rendered with Final Effects' 3-D filters have a particularly rich appearance. And while some plug-in collections include bizarre, gimmicky transitions you'd rarely use, the Final Effects library contains nothing but genuinely useful effects.

The Last Word At \$695, Final Effects is on the pricey side—the base version of After Effects 3.0 itself sells for only a bit more. But the price is justified, given the fact that Final Effects delivers results normally associated with seven-figure video workstations. If you work extensively in After Effects, your system isn't complete without Final Effects.—JIM HEID

RATING: ★★★★★/8.9 **PROS:** Excellent rendering quality; tightly integrated into After Effects 3.0; useful selection of effects. **CONS:** Expensive. **COMPANY:** MetaTools (805/566-6200, metasales@aol.com). **LIST PRICE:** \$695.

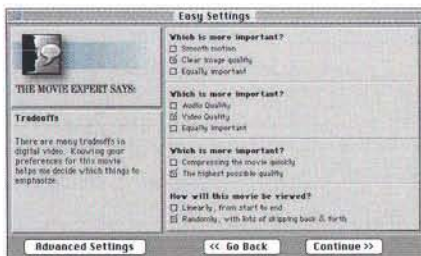
Movie Cleaner Pro 1.1.1

QUICKTIME-COMPRESSION UTILITY FOR
CRISP CD-ROM MOVIES

ONE OF THE MOST IMPORTANT steps in producing QuickTime movies for CD-ROM is compressing them so they'll play smoothly from a relatively slow storage device. Unfortunately, a movie that starts out crisp and clear can look chunky and pixelated after compression. Multimedia developers use blurring, cropping, and scaling to minimize artifacts, but these tricks require a shelf full of software and dozens of steps.

Software developers are coming to the rescue with utilities that streamline compression. Two such products are Adobe's CD-ROM Movie Maker plug-in for Adobe Premiere (see *Reviews*, March 1996) and Terran Interactive's Movie Cleaner Pro, a stand-alone application. While Movie Cleaner combines essential compression features with an appealing interface, it falls short of the Premiere plug-in in some areas.

Like CD-ROM Movie Maker, Movie Cleaner has a blur option that softens edges



Make Me a Movie The Movie Expert feature asks you about the movie and compresses accordingly.

and de-emphasizes video noise for cleaner compression. But Movie Maker's additional blurring options can yield better results with movies containing lots of video noise.

Both utilities can attach a custom color palette (used on computers with 256-color video circuitry) to a movie, but CD-ROM Movie Maker can actually generate the palette's colors; with Movie Cleaner, you create the custom palette in a separate program, then import it into Movie Cleaner.

CD-ROM Movie Maker also has better support for keyframes. Although Movie Cleaner lets you specify the number of keyframes per second, Premiere also lets you control where they appear—a distinct advantage if you're creating interactive movies whose starting places depend on a user's actions. Movie Cleaner also lacks a

data-rate analysis window that predicts how a movie will tax a CD-ROM drive.

Movie Cleaner Pro does have its strengths, though. A unique filter eliminates the annoying dancing pixels that often appear in otherwise static areas of a shot, but the program's primary advantage is a highly interactive operating style. For example, you can pause a compression at any time and compare the before and after versions using a split-screen window. Terran Interactive also has a good customer-service record and makes updates and a shareware version available on its Web site (<http://www.terran-int.com>).

The Last Word If you're a seasoned compressionist who lives in Premiere 4.2, you may not need this product. But if you use another video-editing package, are new to compression, or simply want to add to your toolbox, I recommend Movie Cleaner Pro.—JIM HEID

RATING: ★★★★★/6.5 **PROS:** Excellent interface; supports batch compression; unique filter options; reasonably priced. **CONS:** Few blurring options; limited control over keyframes; no data-rate analysis window; can't generate custom palettes. **COMPANY:** Terran Interactive (408/353-8859, info@terran-int.com). **LIST PRICE:** \$129.

Hitachi StudioPad

GRAPHICS TABLET FOR TIGHT QUARTERS

PRESSURE-SENSITIVE GRAPHICS tablets are the best way to draw and paint on the Mac, but they can be bulky. If you're cramped for desk space, the Hitachi StudioPad offers a compact solution. The 7.5-by-6.6-inch StudioPad takes up less space than the average mouse pad. It includes a cordless pressure-sensitive stylus and 15 user-programmable buttons above its 4-by-5-inch work area. It's similar in size and shape to the Wacom Art-Pad, a smaller version of the ArtZ II (see *Reviews*, December 1995).

Installation is simple: the StudioPad connects to your Mac's ADB port; a pass-through plug lets you attach the pad between other devices, such as the keyboard and mouse. The sturdy pad has nonskid feet, but it's so light you'll probably keep it in your hand as you draw. A plastic overlay provides a smooth drawing surface and lets you secure small images for tracing.

The battery-powered cordless stylus, with one user-definable barrel button, is about the size and weight of an expensive ballpoint pen. A pocket clip completes the metaphor. To extend battery life, the stylus



GISSON

goes to sleep after five inactive minutes.

The pen's internal batteries make it bulkier than the pencil-thin Wacom stylus, but the weight difference is minimal. The Hitachi stylus tip offers greater movement than the stiffer Wacom tip, providing noticeable—and useful—feedback of the pressure you're exerting on the tablet. I found the stylus responsive, and its rounded, penlike contours fit well in my hand. However, the pocket clip makes it entirely too easy for you to put it in your pocket accidentally and wander off with it.

The StudioPad's software is not as refined as the Wacom tablet's. For example, with the StudioPad, you adjust pressure sensitivity numerically, without helpful

graphical controls. But overall, the software is easy to use and works well.

Programming the StudioPad's function buttons is especially easy. You simply click on radio buttons for function keys—control, ⌘, shift, option, or caps lock—and type a keystroke in a dialog box for each pad button. Unfortunately, you're limited to keyboard sequences; the StudioPad does not accept macros created with third-party utilities, like CE Software's QuickKeys or Tempo II from Affinity Microsystems.

Can you draw with a tablet this small? Amazingly, yes. Even though I'm used to having more room, I adapted easily. Your own work habits and preferences dictate which size tablet is best for you. Test driving before purchase is always a good idea.

The Last Word The StudioPad is a well-designed graphics tablet with excellent, pressure-sensitive operation. It's a good choice for illustrators with cluttered desks and artists working in cramped garrets.

—CARLOS DOMINGO MARTINEZ

RATING: ★★★★★/7.5 **PROS:** Small size; excellent pressure sensitivity. **CONS:** Tablet buttons do not accept macros from third-party utilities. **COMPANY:** Hitachi Digital Graphics (408/747-0777). **LIST PRICE:** \$199.99.

MailKeeper 1.0.2

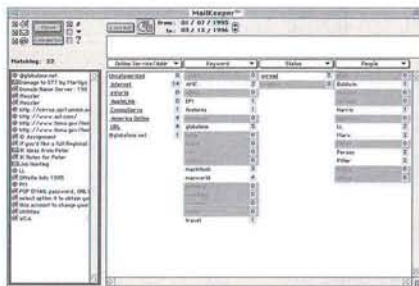
QUICK ONLINE INFORMATION DATABASE

SOME DAYS, IT'S A CHALLENGE just to read all my E-mail messages, let alone remember what's in them. MailKeeper helps me make sense of the seemingly endless data flow.

Rather than acting as a simple E-mail repository, as its name implies, MailKeeper is actually a specialized database designed to consolidate and organize a variety of data, including electronic-mail addresses, free-form notes, text clippings, and of course, E-mail messages. MailKeeper recognizes Internet URLs (Uniform Resource Locators), as well as America Online, AppleLink, CompuServe, eWorld, and Internet mail addresses. Currently there is no way to make MailKeeper aware of other address formats, and you still need a separate application to retrieve your E-mail.

Saving information to MailKeeper is a simple proposition. When you come across text that you want to save, you highlight it, copy the selection to the Clipboard, and enter a hot-key sequence to send the item to MailKeeper; MailKeeper must be running for the transfer to occur.

You assign archived items to one or



Information Categories As you click on categories, MailKeeper displays matching database entries.

more content categories, either as you import them or at any other time. The program comes with eight predefined categories, but you can add as many as you need. MailKeeper names items automatically or lets you append a name to the text before you import it. The subject field becomes the item name for E-mail in a format that MailKeeper recognizes.

MailKeeper displays four category columns at one time (see "Information Categories"). You can customize the column headers and move categories from one column to another by dragging. To search for stored items, click on the categories that you're searching in and MailKeeper displays a list of matching entries.

A feature called Guided Information

Access automatically hides irrelevant categories during searches; MailKeeper shows only those categories that share items with selected categories. As you click on more categories, the columns shrink, making it easier to find what you want. MailKeeper also lets you look for items by content, but searching isn't as fast.

The Last Word Getting comfortable with MailKeeper's approach takes some time, and its Common Ground-based electronic manual doesn't include enough practical examples. MailKeeper also suffers from a few interface quirks: you can add only seven categories at a time—the Add Category dialog box has only seven spaces—and you can't adjust category column widths. I'd also like to be able to import messages into MailKeeper without selecting and copying text. Still, the first release of MailKeeper is worthwhile if you have a large volume of electronic data to contend with. With a few improvements, MailKeeper could become a truly indispensable tool.—FRANKLIN TESSLER

RATING: ★★★★★/5.0 **PROS:** Inexpensive; fast category searching. **CONS:** Needs better integration with mail programs; minor interface problems. **COMPANY:** Nisus Software (619/481-1477, info@nisus-soft.com). **LIST PRICE:** \$35.

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Descent 1.0

WHICH WAY IS UP?

DOES A SHOOT-'EM-UP ADVENTURE have to include lots of blood and mayhem to be fun? Looking at the current crop of games, you might think so. Luckily for the squeamish, Descent changes all that. There's no carnage in this game; your opponents are asteroid-based mining drones. Your mission is to rescue hostages, destroy a power reactor, and get out of the mine before it explodes.

Descent's most stunning innovation is its 360-degree, 3-D maneuverability. Mine shafts head off in all directions, and you quickly lose the concept of "up." You hurtle through shafts, shoot robot drones, and replenish your supplies.

As you maneuver your fighter craft through the mine, it bobs slightly as if on a cushion of air. You actually feel as if you are floating gravity-free. Sounds come from all directions, making for a realistic experience. As your skills improve, the mining robots learn to outwit you, adjusting strategies based on your movements.

In addition to single-player options, Descent offers an anarchy mode in which every person fends for him- or herself, or a



Daring Rescue You've found the hostages. Now you have to get them out alive.

collaborative mode in which players team up against the robots. To test Descent's multiplayer features, I enlisted volunteers to play a network game on four Power Macs connected over Ethernet. The test players included expert gamers as well as novices who had never touched a joystick.

Each player remarked on how unaware they were of their physical surroundings while playing. We all agreed that Descent sets a new standard for player immersion.

If you work in a cross-platform environment, you'll be able to collaborate with up to eight of your coworkers, regardless of their platform preference; Mac and PC versions of Descent can participate in the same network game. And, unlike competing

games, Descent lets single players leave or enter at any time—if one person gets called away to a meeting, you don't all have to quit playing.

Despite its innovations, Descent has its share of minor drawbacks. Although the game installs on your hard disk for optimum play, you're required to leave the CD-ROM in the drive to hear sounds while playing. To provide the fastest action, Descent operates exclusively on Power Macs, leaving 680X0 machines behind. And although the PC version includes 120 additional customer-designed levels, the Mac version ships with just 30 predefined levels.

The Last Word Descent already offers true innovation in the crowded field of adventure games, and its graphics will impress hard-core gamers. When version 1.1 ships in a few months, its support for QuickDraw 3D will make its realistic environment even more impressive. I can hardly wait.—FRED DELISIO

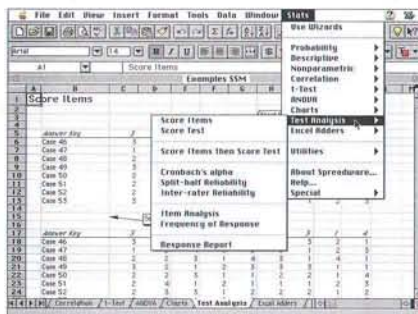
RATING: ★★★★★/8.5 **PROS:** Real-time 360-degree motion; realistic graphics and audio. **CONS:** Fewer levels than PC version; CD-ROM must be in drive to launch; no support for 680X0 Macs. **COMPANY:** MacPlay (714/553-3530, macplay@interplay.com). **COMPANY'S ESTIMATED STREET PRICE:** \$49.95.

Spreadware Statistics Menu 4

REAL STATISTICS WITHOUT LEAVING EXCEL

THERE'S A BADLY KEPT SECRET in the math community that Microsoft Excel's statistics implementation is less than ideal. Excel does provide a foundation on which to build, however, and Spreadware has done just that. The aptly named Spreadware Statistics Menu (SSM) adds a statistics menu to Excel 5. Although you can find many of its functions in Excel's scrolling lists, SSM arranges the basics plus a wide array of advanced statistical functions in a neat, hierarchical menu.

Besides the expected descriptive and probability statistics, you get relatively complete suites of correlation and ANOVA stats. SSM includes the most popular non-parametric statistics and uses X-bar and R charts to represent quality-control statistics. One suite of tests—available in no other standard stats package—evaluates tests in educational or commercial practice. A time-series suite would have been a more conventional choice, so it's gratifying to see this outburst of marketing novelty.



This Is Only a Test One of SSM's unique features is a set of tests for evaluating tests, from academic exams to questionnaires to personality profiles.

Spreadware's implementation of stats functions is very good, particularly if you have enough memory; you should have 24MB on your Power Mac and allocate at least 5MB more than the minimum for Excel. That will improve calculation performance by nearly an order of magnitude over running in memory-cramped mode and preclude an array of Excel run-time errors that seem to pop up whenever SSM doesn't have room to run properly.

Spreadware appears to have reprogrammed most of the stats functions, which now run faster than their Excel equivalents. For the adventurous, Spreadware explains how to implement new functions in Excel's

Visual Basic and includes sample code.

If you use Excel every day, adding SSM makes more sense than learning another program's data-handling conventions and charting commands. SSM's use of Excel's Range Wizards to set up analyses is especially nice, and you can use Excel's charts to produce colorful 3-D presentations.

SSM is necessarily weaker at exploratory statistical graphics than Data Description's Data Desk (see *Reviews*, March 1996) because SSM depends primarily on Excel for charts; nor would it be a good choice for the census-bureau-size data sets that SPSS (see *Reviews*, February 1996) specializes in, since SSM is limited by Excel's maximum worksheet size. Also, SSM's manual contains inconsistencies, but if you have some Excel experience you can work around them.

The Last Word This Excel add-in bears comparison with leading stand-alone statistics packages like Statistica and SYSTAT. It's cost-effective, and Excel users can put it to work in minutes.—CHARLES SEITER

RATING: ★★★★★/7.4 **PROS:** Fast; convenient; tests for "test analysis." **CONS:** Limits on data-file size; manual has some glitches. **COMPANY:** Spreadware (619/772-1758, spreadware@aol.com). **LIST PRICE:** \$229.

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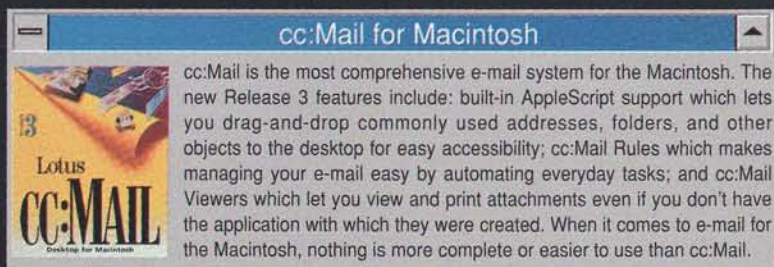
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Mac IRISPen

PORTABLE, ACCURATE PEN OCR SCANNER

THE MAC IRISPEN IS A RESEARCHER'S dream come true, particularly for PowerBook users who want to extract a few paragraphs from a report or when using a full-size flatbed scanner would be impractical or overkill. This small, handheld scanner grabs text at 100 characters per second, converts it using OCR software, and inserts it directly into your application. The pen recognizes most printed material with a high degree of accuracy, and you can improve its precision by creating custom dictionaries of the fonts you encounter most often and training it to read oddball characters and fonts.

The miniscanner consists of the data pen itself, roughly the size of a VCR remote control, linked to an interface device that doubles as a cradle. A cable from the interface, which is powered by batteries or an AC adapter, plugs into your serial modem or printer port (use the modem port if your desktop machine is on a network, since you must disable AppleTalk when using the pen with the printer port). Both the modem or printer and the IRISPen can be plugged in simultaneously using a pass-through con-



SUZANNE ROADY

necter on the interface. A parallel-port version of the IRISPen that uses a proprietary NuBus card is also available.

To use the IRISPen, you click on the IRIS application icon, lift the pen from its cradle, and pass the pen over a line of text as if you were using a highlighter. You can view the line you're scanning through a window in the pen; guidelines help you pinpoint the line you wish to capture. A roller at the tip of the pen acts as a start/stop switch, and a sliding control on the pen adjusts brightness. You can even insert a carriage return, space, tab, or other user-defined character by clicking a button on the side of the pen. Text of varying size, style, and quality presents no problem. (Because the scanning path is less than a half-inch high, though, text must be 22-point or smaller to be recognized.)

The IRISPen is remarkably forgiving of errant pen strokes; it accurately translated text even when my hand movements varied in speed or were slightly skewed. The pen also accommodates both left- and right-handed users. You'll need at least a 68020 with a Paged Memory Management Unit, 8MB of RAM (16MB for a Power Mac), and 32-bit addressing turned on.

The Last Word The IRISPen isn't designed for high-volume OCR applications and can't capture images, but it shines at specialized data input, such as grabbing customer numbers from invoices or transferring figures from spreadsheets. It's small enough to be easily portable, and its OCR accuracy is sufficient for most applications (although you'll want to double-check figures scanned in from spreadsheets). This is definitely a niche product, but one that meets an important need.—DAVID D. BUSCH

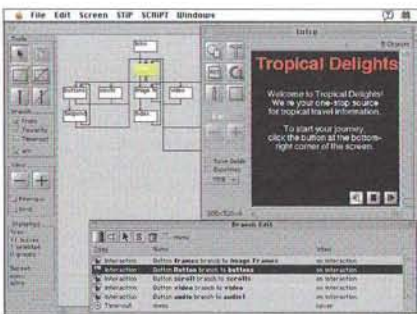
RATING: ★★★/6.9 **PROS:** Portable; accurate; lets you scan just what you need; accommodates uneven scanning strokes and variable text. **CONS:** Tedious for capturing large quantities of text; networked users must turn off AppleTalk to free up printer port. **COMPANY:** Image Recognition Integrated Systems (407/395-7831, iris@hooked.net). **LIST PRICE:** \$299.

STiP Professional 2.1

PROMISING, BUT FLAWED, MULTIMEDIA AUTHORIZING PROGRAM

ONCE YOU GET PAST ITS AWKWARD name, you'll find STiP Professional is a powerful, if quirky, multimedia authoring tool that lets you create interactive titles for the Macintosh and Windows, save finished projects in a protected form, and distribute them royalty-free. STiP stands for Screens, Trees, and scrIPTable Player, the program's defining characteristics. Rather than arranging media elements along a timeline, as in Macromedia Director, you draw lines that interconnect screens, creating a flowchart called a tree (see "STiPulations").

Developed by Grant Software Solutions and distributed by MacVank, STiP has a graphical development environment similar to that of Apple's Apple Media Tool and Macromedia's Authorware Professional. Unlike Apple Media Tool, however, STiP has a robust programming language for reading and writing files, controlling a production's elements, displaying movies and playing sounds, and interacting with external devices. And unlike Authorware, STiP provides rudimentary support for text and



STiPulations You define the relationship between screens and their elements using STiP's Tree Edit and Branch Edit windows. It's a fairly simple process, although you'll scratch your head a bit at first.

is saddled with a vague manual and simplistic sample projects.

STiP's built-in screen editor lets you import graphics in several formats, QuickTime movies, and text. Its tools let you draw simple shapes; type text; and create interactive buttons, frames, and scroll bars. You can also create master pages to hold elements that are used on several screens; only Authorware Professional 3.0 has a similar feature.

Although the screen editor is powerful, it has some surprising shortcomings. Unlike virtually every draw package, STiP doesn't let you press the shift key to constrain

movement horizontally or vertically while dragging an element, or to retain an element's proportions when resizing. Scroll bars are another problem: the bars STiP creates don't look or work like standard Mac scroll bars, and attaching one to a lengthy text field is a cumbersome process.

STiP's scripting language provides a full complement of control structures, variable types, and functions. Unfortunately, the language bears little resemblance to other scripting languages, so even experienced authors will find themselves at the bottom of the learning curve.

The Last Word STiP Professional is an odd mix of genuine power and glaring weaknesses. I wouldn't use it for text-oriented projects, but it is well suited to graphically complex ones. (You can download a demo version from <http://www.cinet.ab.ca/macvank/>.) STiP Professional has promise, but it needs some work to, um, live up to its name.—JIM HEID

RATING: ★★/4.9 **PROS:** Good (if erratic) performance; royalty-free distribution of final projects; robust scripting language. **CONS:** Awkward omissions; nonstandard scroll bars; poor documentation. **COMPANY:** MacVank (403/232-6545, mvc@eworld.com). **LIST PRICE:** \$1295.

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A MINU+E AGΘ.

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Sony PC Cam

DESKTOP CAMERA LACKS AV STRENGTH

SONY'S PC CAM DESKTOP VIDEO camera lets you record impromptu QuickTime movies, scan still video images, or project your smiling visage over a videoconferencing system using your AV-equipped Mac. Like its competitor, VideoLabs' FlexCam (see *Reviews*, December 1994), the PC Cam features a manual-focus lens with a 0.25-inch color CCD (charge-coupled device) mounted on a flexible gooseneck.

If your desk space is limited, you'll appreciate the PC Cam's small size. Its base is just 3.5 inches wide—half the width of the FlexCam—and its neck is 11 inches long, compared with the FlexCam's 18 inches. Fortunately, the PC Cam's smaller size does not inhibit its pliability.

Like the FlexCam's, the PC Cam's neck retains shapes no matter how much you twist and turn it; you can shoot objects sitting on a tabletop or frame a person's face without repositioning the camera's base. Even better, you can center the camera in front of your monitor so that you look directly into the lens while viewing on-screen images, a must for maintaining the



The Perfect Frame The PC Cam lets you frame and focus your subject with alarming accuracy. But background highlights tend to wash out and the lens produces a pronounced fish-eye effect.

appearance of eye-to-eye contact during videoconferencing. You can also rotate the camera head 90 degrees without adjusting the neck—compared with 60 degrees for the FlexCam.

Unfortunately, the PC Cam's sound and video are second-rate next to the FlexCam's. For example, the PC Cam sports a monaural microphone; the FlexCam records in stereo. And although the PC Cam offers two video jacks—composite and S-Video—Sony neglects to include an S-Video cable.

The PC Cam can focus on objects as close as 0.44 inch (the FlexCam goes as close as 0.25). As with the FlexCam, the wide-angle lens accommodates videoconferencing, but distorts close-up shots. Even though the PC Cam lets you adjust the iris to compensate for poor lighting, it requires at least 9 lux to function, compared with less than 3 for the FlexCam. As a result, you may have to turn on a few extra lights in your office, which can result in too-bright highlights and exaggerated contrast.

The Last Word The PC Cam's inconspicuous appearance is its only real advantage apart from its smaller size—the bizarre-looking FlexCam, in contrast, resembles something from a Terry Gilliam movie. Though the PC Cam performs its job reliably, it's inferior to the FlexCam in most regards. Equipped with higher-quality sound, better video, and all the necessary cables, the FlexCam is simply the better camera.—DEKE MCCLELLAND

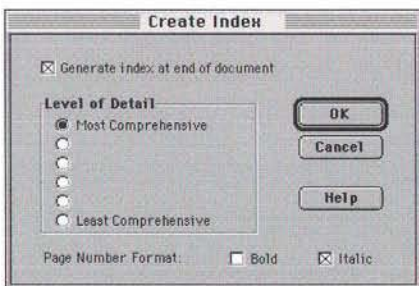
RATING: ★★/5.9 **PROS:** Freestanding with gooseneck mount; small footprint; lens rotates 90 degrees. **CONS:** Mono sound; lacks S-Video cable; lighting response inferior to FlexCam's. **COMPANY:** Sony Electronics (941/731-4940, contact@sel.sony.com). **LIST PRICE:** \$499.

Indexicon 1.0

INDEXING PROGRAM FOR WORD 6

BEFORE I WROTE THIS REVIEW, I was skeptical of computer-based indexing programs. Having written it, I'm even more skeptical. I looked at Indexicon, a program that automatically finds indexable terms in Microsoft Word 6 documents and compiles an index.

Indexicon is easy to use: simply select it from Word's Tools menu, set the level of detail, and press a button. First I used Indexicon on a chapter from a book on Macintosh fonts. At the Most Comprehensive level, the program took about 11 minutes to create a 175-entry index for a 14-page chapter. It found key terms such as *black-letter type*, *Chancery script*, and *kerning*. It was even smart enough to list two-word font names such as *Monotype Grottesque*. But things went downhill from there. While it indexed many relevant terms, it also missed numerous terms, including *em dash*, *leading*, and *pica*. It was flummoxed by proper names, listing Nicolas Jensen as *Nicolas Jensen* rather than *Jensen*, *Nicolas*; it had a tendency to start entries with adjectives (*Slushy winter roads*); it treated plurals as separate entries, listing *Descender* on one page and



Indexing Options Indexicon lets you create an index that ranges from minimal to comprehensive.

Descenders on another; and it didn't recognize apostrophes, resulting in entries such as *Computer's instructions*.

Finally, Indexicon's index contained a lot of inappropriate entries, including *Musical compositions*, *Newspaper*, and *Wine*. The latter entry illustrates Indexicon's fatal flaw; unlike a human indexer, it doesn't understand what it's reading (the chapter noted that early printing presses were based on wine presses). You can eliminate such spurious terms by viewing flagged entries in a document and editing them before compiling your final index, but that's time-consuming. When Indexicon indexed a chapter of a book about the Internet, it listed many relevant terms—*Internet Relay Chat*, *Modem speeds*, *NSFNET backbone*—and a

good deal of nonsense, including, *Santa Cruz Banana Slugs*, *Walnut-sized sub-brain*, and *Uncle Steve Yahoo*. Granted, the author writes in a colorful style, but no sane indexer (and indexers are an extraordinarily sane lot) is going to enter *Uncle Steve Yahoo*. Indexicon did better with a dry-as-a-bone article on programming, finding programming commands and other special terms. Still, the usable-entries-to-chaff ratio was too high. Decreasing the level of detail didn't help. A midrange setting didn't find enough relevant entries, and the Least Comprehensive setting generated a one-entry "index" for the font-book chapter.

The Last Word A computer-based indexer is a laudable idea, but one that needs work. Perhaps a bank of supercomputers running a neural net could equal the brainpower of a human indexer. This personal-computer-based program can't. Instead of buying Indexicon, I'd recommend spending \$40 on *The Chicago Manual of Style* and reading the section on indexing.—ERFERT FENTON

RATING: ★★/3.0 **PROS:** Automates finding indexable terms. **CONS:** Has trouble identifying indexable terms; works only with Microsoft Word 6. **COMPANY:** Iconovex (612/896-5100). **LIST PRICE:** \$129.

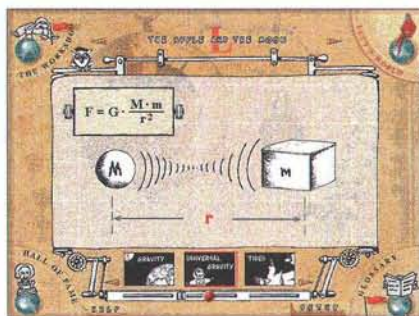
The Cartoon Guide to Physics

ENTERTAINING INTRO TO KINEMATICS

LARRY GONICK'S *CARTOON GUIDES* are a smashing success in traditional publishing—the physics and the statistics guides are perennial best-sellers in their subject areas. HarperCollins Interactive has performed the admirable feat of making a CD-ROM that's as good as Gonick's books.

The Cartoon Guide to Physics (CGP) covers the first semester's worth of material in a high-school or introductory college physics course: velocity, acceleration, gravity, and angular momentum. It doesn't include electricity and magnetism, or thermal physics. The program is designed to accompany regular coursework; however, someone with intellectual curiosity and a minimal background in algebra could probably follow most of the material.

There are two action sections of the CGP screen (Lucy's World and The Workshop) and two reference sections (Hall of Fame and Glossary). In Lucy's World, an astronaut character lectures and acts out



Physics Pix Make Equations Click In the Cartoon Guide's Workshop, ingenious animations explain standard equations.

concepts such as constant gravitational acceleration and orbital motion. The Workshop lets you perform on-screen experiments—carefully keyed to the Lucy's World tutorial—on potential versus kinetic energy, conservation of momentum, acceleration, and gravity (see "Physics Pix Make Equations Click").

There are plenty of educational CD-ROMs on the market in which sound and animation are merely a distracting sideshow. CGP is different; its multimedia features—which are based on the art in the original book—make serious and complex points, just as Larry Gonick's cartoons perform genuine educational func-

tions in the printed *Cartoon Guide* series.

CGP has a few quirks. At several points Lucy rattles on about equations while the screen display remains static. Hall of Fame contains short descriptions of twentieth-century physicists, although the physics lessons stop with Newton's first discoveries in the seventeenth century. The Mac version has Windows-style close boxes, and sometimes it's tricky to restart an animation after you've ducked out for a peek at the Glossary section.

On a more serious note, the program requires 8MB of RAM. If ever there was a program designed to make education happen on millions of Performas, CGP is it; unfortunately, most Performa owners will have to pop for a RAM upgrade first.

The Last Word Cartoon Guide to Physics is a real value. It teaches a good introductory mechanics course, and it's interesting to users who just want to understand how the universe works.—CHARLES SEITER

RATING: ★★★★★/8.6 **PROS:** Animations really teach—they aren't just window dressing. **CONS:** Limited to mechanics; requires 8MB of RAM. **COMPANY:** HarperCollins Interactive (212/207-7000, interactive@harpercollins.com). **LIST PRICE:** \$49.95.

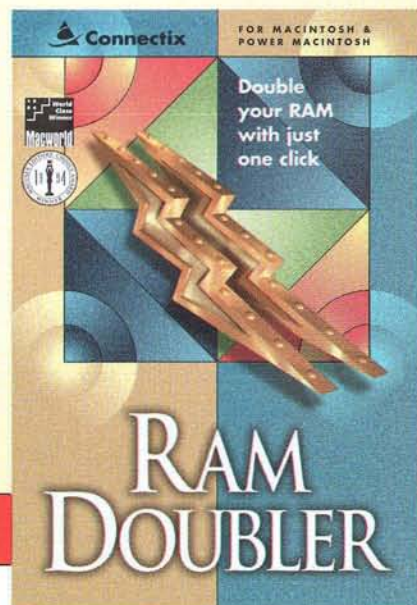
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In the 1st Degree

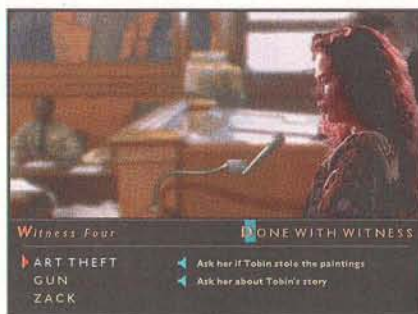
REALISTIC, INTERACTIVE LEGAL THRILLER

EVEN IF YOU DIDN'T GET HOOKED on the O. J. Simpson trial, there's a good chance you'll get sucked into Brøderbund's high-tech courtroom drama, *In the 1st Degree*. This interactive adventure mixes intrigue, suspense, psychology, and a dash of cynical humor in a slick package that's nearly irresistible.

When you play *In the 1st Degree*, you see the world through the eyes of an attorney working a complex, high-profile murder case. Your job isn't to determine whodunit—art-gallery owner James Tobin freely admits he shot his partner. As prosecutor, you need to systematically disprove Tobin's claim of self-defense so you can win a first-degree murder conviction.

More than any game we've played, *In the 1st Degree* has the look, feel, cinematography, and pacing of a high-quality television drama. Emmy-award-winning producers, working with professional actors, state-of-the-art digital-video techniques, and a first-rate script, bring new realism to the genre of interactive fiction.

There are no cardboard computer-game characters here; the players in this



On the Stand It's obvious that Ruby's holding something back. She'll talk, but only if you ask the right questions.

drama have emotional depth and humanity. Witnesses react realistically to your questions, and their responses vary depending on your style of questioning. Only by successfully playing on the psychological quirks of each witness can you uncover the full story (see "On the Stand").

A television news team shows up between scenes to provide one-dimensional "expert analysis" and commentary. Their superficial pontification provides wry humor to balance the dark drama as it unfolds.

Our first game started as a solo effort, but by the time we reached the courtroom, six of us were crowded around the Mac, loudly arguing over legal strategy.

Even with our family's best legal minds on the case, we were barely able to score a second-degree conviction, and post-trial TV commentators wasted no time roasting our performance. Undaunted, we tried again and watched how the trial unfolded differently with each new strategy. Finally we returned, armed with the official \$19.95 strategy book, and landed a solid first-degree conviction and a dramatic ending that exceeded our expectations.

We only encountered one minor conflict: we had to unplug the QuickTime Power Plug extension before we could play. But a helpful dialog box pointed out the conflict in advance.

The Last Word *In the 1st Degree* is a technological tour de force. If interactive TV is the future of home entertainment, *In the 1st Degree* takes a big step toward that future.—GEORGE AND BEN BECKMAN

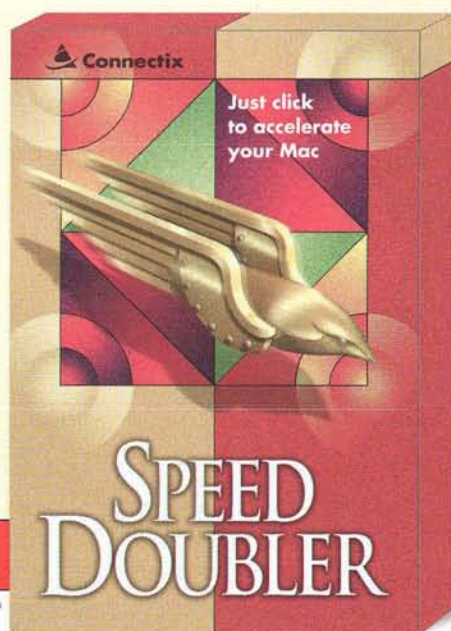
RATING: ★★★★★/8.8 **PROS:** Seamlessly integrated digital video; excellent acting and cinematography; multiple plot threads and endings. **CONS:** Less interesting after a few playings; incompatible with QuickTime Power Plug extension. **COMPANY:** Brøderbund Software (415/382-4700, webmaster@broder.com). **COMPANY'S ESTIMATED STREET PRICE:** \$49.95.

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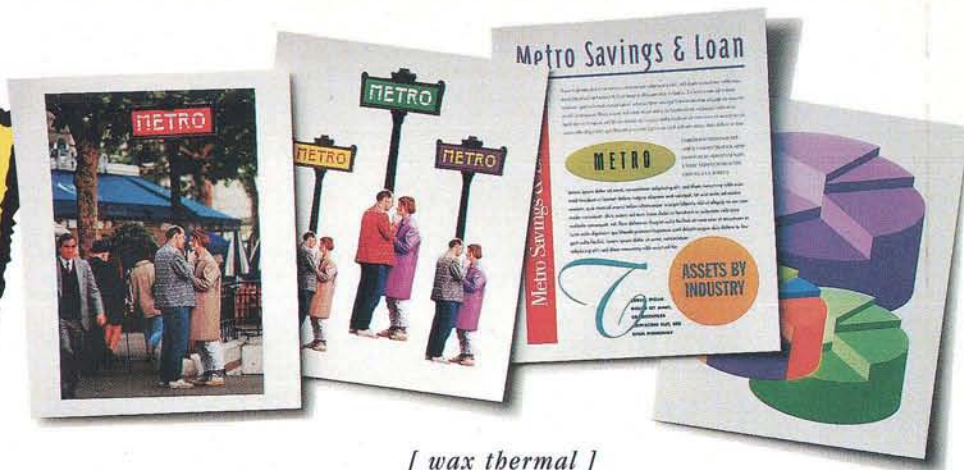
spreadsheet with Speed Doubler in 6 seconds, without it...13 seconds. Run a summary calculation of 1500 FileMaker Pro records in 90 seconds instead of 3 minutes. It's not magic. It's Connectix Speed Doubler. And if you own a Power Mac, you gotta have it. Get Speed Doubler today wherever fine computer products are sold. Your satisfaction is guaranteed.



Requirements: Macintosh equipped with a PowerPC, 68040, or 68030 microprocessor • System 7.0 or greater • 8 MB physical RAM or greater • Compatible with Connectix RAM Doubler • Not compatible with: Mac Plus, Mac SE, original Mac Classic, original Mac LC or PowerBook 100

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Circle 93 on reader service card

MapLinx 3.0

A ZIP-CODE-LEVEL MAPPING PROGRAM

DATA-MAPPING SOFTWARE RANGES from utterly basic programs that place a dot in the center of each zip-code area where you have a customer to the breathtakingly sophisticated programs used to reapportion legislative and congressional districts. MapLinx 3.0 falls into the zip-code-dot category.

Your data must be in a tab-delimited text file, and every record needs a zip code. You can also set up a publish-and-subscribe link with an application (MapLinx reads files from ACT, 4th Dimension, DataDesk, and Control Classic). MapLinx can display data as zip-code centroids, or it can shade counties or states based on a designated field. The program quickly and accurately read the 5- and 9-digit zip codes in my 2600-record data file.

MapLinx provides almost no data-manipulation capabilities: it can count the number of records for each zip code, county, or state; and it can total or average the values in a field for all the records in each zip code, county, or state. Unfortunately, it provides few other useful capabilities. For example, MapLinx can't automatically dis-



Northeast Sales Sales ranges were set manually. The progression from light yellow to dark red matches sales figures.

play points of different sizes or colors based on a value (you can modify points and colors manually). It can't calculate across fields in the data file—for example, to compare 1995 sales against 1994 sales. Nor does MapLinx provide statistical or analytical tools—you can't identify outliers, cross-regional trends, and so on. It can automatically define breakpoints—that is, it can break the values into ranges such as \$0 to \$5000, \$5001 to \$10,000, and the like.

MapLinx lets you label points or regions on the map, add and format text and point symbols, and hide or display a few geographical references such as major roads and major cities. Unfortunately, you can't modify the text or layout of a map's legend.

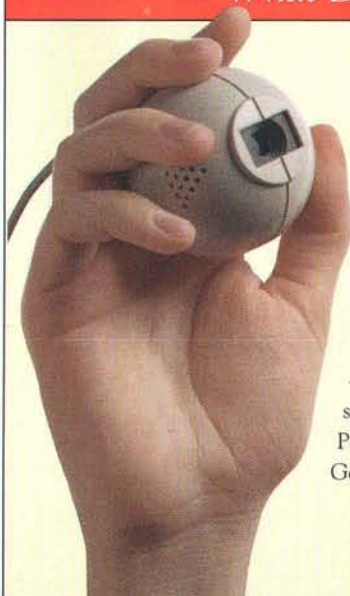
A serious drawback is MapLinx's closed architecture. You cannot create custom

regions, such as sales territories, or add map geometry, such as municipal boundaries. In fact, you can't even add Hawaii and Alaska. MapLinx also has a few interface quirks. For example, to hide or display map features, labels, or data on the map, you must press A (to *always* show), R (for a *range* of zoom levels you can't set), or N (to *never* show), and double-click on cells in the Data Layers or Map Layers palette. This isn't merely weird—it's hard to remember. And tugging on a corner to make the map bigger or smaller changes its scale, while tugging on its top, bottom, and sides changes the area displayed.

The Last Word MapLinx is a useful tool if you only need to see where your customers are located. It can produce basic reports, such as a list of records, or a quick summary of records by data type. But if you need to analyze your company's market opportunities or sales, simple lists and quick summaries won't be enough.—DAN LITTMAN

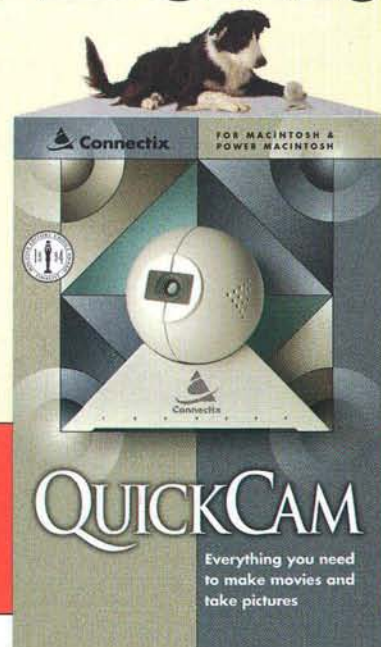
RATING: ★★/4.4 **PROS:** Easy to use; snappy screen refresh. **CONS:** No data-manipulation capabilities; few visual-enhancement tools; can't create custom regions; interface quirks; no map for Alaska or Hawaii. **COMPANY:** MapLinx (214/231-1400). **LIST PRICE:** \$149.95.

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Created on a Macintosh with
64MB of Kingston memory.

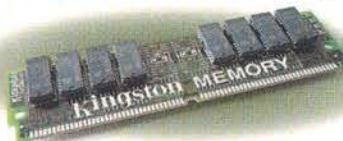
Created on a Macintosh
with 8MB of Kingston
memory.

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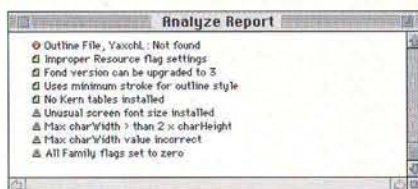
theFONDLer 4.0.1

FONT UTILITY DIAGNOSES PROBLEMS

DO YOUR FONTS EVER BEHAVE strangely? Perhaps a font you installed doesn't show up in a Font menu. Or it shows up in the menu but prints as another font. Maybe a font seems to print just fine—until you notice it has no kerning pairs. If you use a lot of fonts, sooner or later you'll encounter behavioral mysteries. In many cases, theFONDLer can solve them.

This diagnostic utility can spot—and often fix—a variety of font problems. (Its name derives from the FOND—font family descriptor—resource.) Font troubles stem from a number of sources, including font-ID-number or -name conflicts, missing fonts, damaged files, or files that weren't created according to specs. theFONDLer spots these anomalies, and others.

The Analyze function checks your font library for possible problems and generates a list of any glitches it finds. Icons indicate the severity of each problem, from items of interest (for example, the font requires the Symbol font to print certain characters) to highly suspicious findings (a corrupt PostScript printer file). These findings don't



Inner Workings of Fonts theFONDLer's Analyze function checks fonts and lists potential problems.

always tell you why a font is misbehaving, but in some cases they point you to a solution; if a file is damaged, for example, you can try reinstalling the font from its original disk. I used Analyze to check fonts on a bargain-priced CD-ROM; when the report indicated that the fonts didn't include kerning tables, I didn't bother installing them.

theFONDLer can also help you organize your fonts. The Collect function gathers all the fonts on your hard disk into a single folder; the Disburse function arranges them into family-based folders. Once theFONDLer rounds up your fonts, you can have it check for duplicate font-ID numbers or names, which can cause frustrating display and printing problems. Another handy option automatically deletes unwanted screen-font sizes, which many ATM users like to do.

You have to know a thing or two about the internal workings of fonts to understand

many of theFONDLer's messages. Even though the manual explains diagnostic messages, a casual user probably won't know what to do when informed that "Family ID differs from Resource ID." Unfortunately, the manual, although detailed, does little to enlighten you as to what some of the problems might mean, or what you can do to fix them. The user interface can be intimidating as well; I found navigating from menu item to dialog box to subdialog box to be confusing in some cases.

The Last Word theFONDLer is a versatile and valuable diagnostic tool, but it's not for everyone. If you understand the basics of how fonts work, but are still bedeviled by puzzling font problems, theFONDLer may be just what you need. It can also come in handy for owners of huge font collections, font designers, people who want to check the quality of bargain fonts, or those who send files to imaging service bureaus.—ERFERT FENTON

RATING: ★★/6.5 **PROS:** Extensive tests for font problems; aids for organizing fonts. **CONS:** Problem explanations and solutions not always clear; user interface needs work. **COMPANY:** Rascal Software (805/255-6823, rascal@rascalsoft.com). **COMPANY'S ESTIMATED PRICE:** \$69.95.



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Journal (1/96). It "...puts all other Mac databases to shame," raves Small Business Computing Magazine (1/96). FileMaker Pro 3.0 only costs \$99 to upgrade or \$199 for the full product.

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GET ON THE WEB

FORGET UNIX — BUILD YOUR SITE ON THE MAC



You say you're feeling queasy because your boss just stopped by your office and asked, "Where's our Web server?" You feel oppressed because you're supposed to get online order processing, technical support, and periodic video updates of the office aquarium up and running by Friday? You think that your life is over because this means you finally have to learn Unix? Well, cheer up, Bucko. You are about to read everything you need to know to get a Web server set up by Friday—perhaps not this Friday, but one in the near future. All you need is your Macintosh wiles, and a friend in the accounting department to funnel a little extra money your way.

Conventional wisdom holds that you get your company online by renting space on a Unix Web server from your friendly neighborhood Internet service provider. Such providers have a fast connection to the Internet and an experienced staff happy to charge you good money to set up and deliver your corporate home page. While this approach works, you're stuck with whatever server technology your provider supplies, which usually means maintaining (or paying a Web guru to maintain) your site using FTP and archaic Unix commands. And if you want to

do fancy things like custom orders, secure commerce, database retrieval, or real-time multimedia (for example, your boss's GuppieCam), you're likely out of luck.

But wait. Shouldn't your Mac be able to do this? A Web server is, after all, nothing more than a program running on a computer that has a full-time TCP/IP Internet connection. With TCP/IP built into System 7.5 (it was previously available as a System 7.1 extension), the Macintosh should be a natural at home-page delivery.

A Mac-based server lets you take advantage of technology you already understand, access information you already have on hand, and process it with tools you already know how to use. Some servers even take advantage of the Mac's graphical interface to make Web-server setup point-and-click simple. But can a Mac running one of the several server products now available really do the job a Unix box can?

To find out, Macworld Lab compared five Mac Web server products—Quarterdeck/StarNine's MacHTTP and WebStar, httpd4Mac shareware, InterCon's InterServer Publisher, and Tenon's MachTen—for performance, ease of use, and features, in a range of scenarios running on a Power Macintosh 7500/100, an excellent choice for server hardware. And we tested a Unix server, the NCSA HTTPd running on an IBM RS/6000 Model 250, to see if the Mac can compete in the real world. The Mac makes a good showing, although it doesn't do everything as well as a Unix server. It's certainly a contender worth some serious attention.

Which Mac Is Right?

Just about any Macintosh can run TCP/IP, so you might think any Mac would do as an Internet server. The processing demands placed on an Internet server, though, require at least a 68040 processor, and a Power Mac is really a better candidate for handling medium to heavy traffic.

Which OS version and TCP/IP support you use also affects performance. MacTCP has some painful limitations. First, it is not PowerPC-native, so it runs at some disadvantage on Power



Meeting the Challenge A Power Macintosh 7500/100, running WebStar server software, makes a formidable competitor as a World Wide Web server.

PLANNING FOR THE RIGHT WEB SERVER

Before you run out and assemble a server, you need to consider several important factors: the audience you intend to serve, the content you want to deliver, the Internet connection you can afford, and the minimum performance you need in order to succeed.

Who Is Your Target? As with other media, you're trying to reach a particular audience with your Web server. It could be current and prospective customers, business partners, like-minded interest groups, or even your competitors.

You should determine which of three kinds of visitors you're targeting: occasional visitors may browse your page lightly and never return; regular visitors may return to your page repeatedly to obtain some service, such as product information or technical support; frequent visitors, such as people in your own organization, may use your Web page as a regular part of their information-processing environment. If you expect only occasional visitors, you can get by with a much less capable Web server than if you offer order-entry services and real-time video. (For more on business strategies, see the feature "Stay on the Net," elsewhere in this issue.)

Sensitivity about Speed You should also consider the speed at which your audience will be connecting to you. Most home Internet users still connect via modems at the relatively slow rates of 14.4 to 28.8 Kbps. Small-business users frequently have medium-speed digital connections that range from 56 to 128 Kbps. Corporate users can often connect at speeds of 256 to 1544 Kbps or higher. Users on your local LAN will be access-

ing at 10 Mbps or even 100 Mbps.

This last group is an oft-overlooked audience. Web serving isn't just for the Internet; you can use in-house private Web serving to quickly roll out client-server applications and internal information-delivery systems. User-connection speed determines how powerful your server hardware and Internet connection must be, and how data intensive your content can be. Your Internet connection should be fast enough to accommodate two or more simultaneous users at the fastest user speed you expect. This means that two users can move data over the link simultaneously, even when several times that number of users actually are viewing the site. Most of the time those users will be reading the page, not moving traffic.

Content Matters The simplest Web page presents primarily textual information, with graphics incidental to the content. If your content falls into this category, you can expect to serve a great many users with very modest hardware and Internet speeds.

More sophisticated Web pages present integrated text and graphics, with important information contained in the graphics. You will need moderately fast hardware and Internet access, and you should expect to support fewer simultaneous users than you could with text-only content.

Some Web pages combine stock text and graphics with information retrieved from one or more databases. The Web server handles the task of querying the necessary databases and formatting the results for presentation to the end user as an HTML document. Such additional processing may not result in more information going to the user, and hence there's no need for a faster Internet connection. But it will require a beefier hardware platform to run Web-serving software and database software simultaneously.

The most sophisticated Web pages include the ability to deliver multimedia information, such as audio

and video files. Such servers may require stand-alone applications to deliver a multimedia data stream in real time. For this application, you need hefty hardware and high-bandwidth Internet pipes.

Connection Alternatives If money were no object, you'd get a 155-Mbps fiber-optic Internet connection and be done with it. But money is often a big object, and because your Internet connection fee is a recurring bill, connection speed will likely be the single largest cost factor you consider.

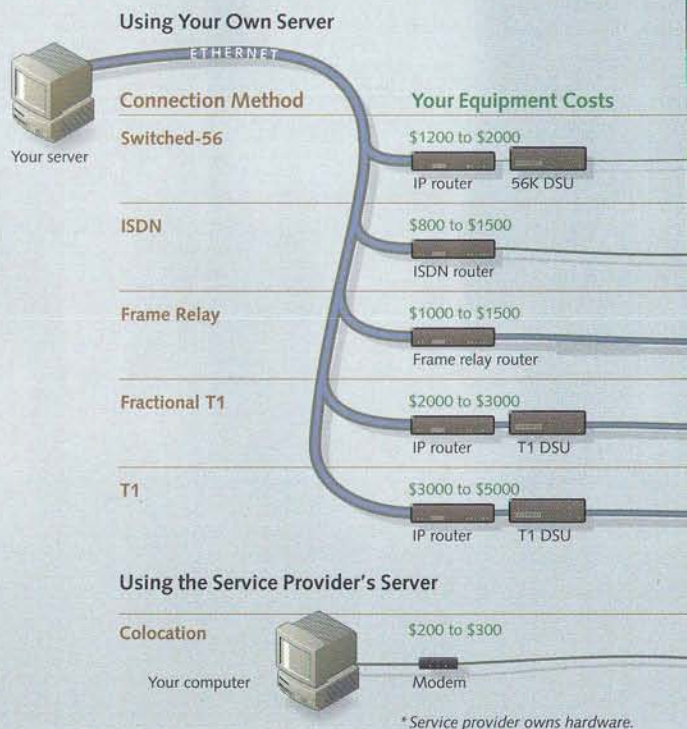
Today you can choose from a half-dozen Internet-connection methods, with varying trade-offs between cost and speed (see the diagram "Web-Connection Options and Costs"). The most important attribute of any Web connection is dedicated access. For your server to be continuously accessible to the outside world,

your Internet connection must be up 24 hours a day, every day. The second most important attribute is connection speed. The minimum speed to consider is 56 Kbps, which requires a digital link of some sort. This rules out analog modems as an alternative.

Some low-cost switched (dial-up) digital links, such as Switched-56 and ISDN, incur usage costs from the telephone company, ranging from a penny per minute to long-distance telephone rates. These costs may make continuous connections impractical. For example, an ISDN connection at a penny per minute would cost \$14.40 per day, or \$432 per month. You could easily buy a nonswitched digital link for one month's costs.

A workaround is the *virtual dedicated connection*: your access provider automatically dials up your server whenever someone on the Web wants to look at your site. Digital call setup takes only a second or two, and the line can stay up until several minutes of inactivity have passed. Such a connection has the appearance of a

WEB-CONNECTION OPTIONS AND COSTS



dedicated connection but incurs costs only when it's actually moving data.

Whatever connection you use, secure competent technical help for installation and configuration. Digital links can be difficult to get working, but once they're in place they're usually reliable and trouble-free. Most access providers include installation support in their start-up fees.

An alternative to buying your own digital connection is to place your server hardware on your access provider's LAN. Called *colocation*, this technique lets you share the access provider's high-bandwidth Internet connection (usually T1 or faster) while eliminating the fixed monthly cost of a digital link. The access provider still charges you for Internet access, usually by gigabyte of information your server delivers. Prices range from \$10 to \$50 per gigabyte. The disadvantage of this approach is the inconvenience of maintaining your server remotely. You have to run an FTP server application alongside your Web server for maintenance access.

COSTS

Monthly Line Costs

\$100 to \$200

Switched-56 (56 Kbps)

\$25 to \$75

ISDN (56 to 128 Kbps)

\$125 to \$1000

Frame Relay (56 to 1544 Kbps)

\$100 to \$1000

Fractional T1 (64 to 1544 Kbps)

\$500 to \$2000

T1 (64 to 1544 Kbps)

\$0

Monthly Service Costs*

\$300 to \$600

56K DSU IP router

\$300 to \$800

WAN router/term server

\$300 to \$1500

WAN router/term server

\$300 to \$1000

T1 DSU IP router

\$1500 to \$2500

T1 DSU IP router

\$500 to \$800

Provider's server

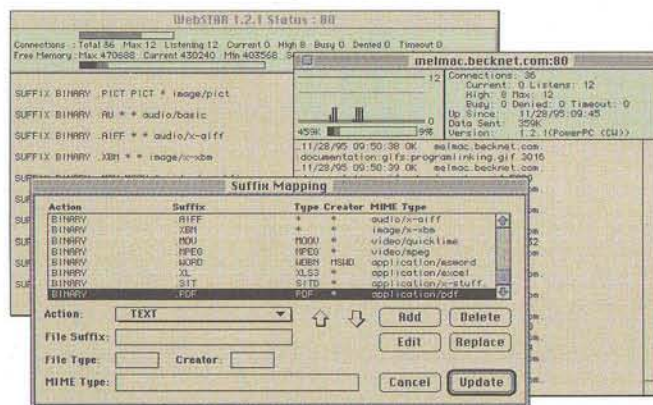
The Net

Internet

Macs. Second, it supports only 64 simultaneous connections. Most server applications reserve some connections for other uses, reducing that number to 50 or fewer. This may sound like a lot, but modern Web browsers often open 5 or more connections to download text and graphics in parallel, so 50 connections translates to no more than 10 simultaneous users.

Open Transport Will Help Apple is replacing MacTCP with its new protocol stack, Open Transport, which runs native on Power Macs, has no connection limitations, and generally performs much better than MacTCP. However, at this writing Open Transport is having a troubled birth, with problems ranging from incompatibility with existing MacTCP-based applications to unreliable operation and system crashes. None of the currently available Mac Web-server products have been updated to work reliably with Open Transport, although all vendors say they will have Open Transport-compatible updates by the time you read this.

Apple's Integrated Solution An alternative to buying off-the-shelf software and hardware and building a server yourself is to use one of the Apple Internet Service Solution (AISS) bundles, which combine a selected Workgroup Server hardware



Server Control Center WebStar lets you remotely monitor and control one or more WebStar servers. In addition to providing real-time use statistics, including a traffic meter and traffic-history graph, WebStar lets you change any of a server's operational attributes, such as MIME types and suffix mapping.

package with a CD-ROM of Web-server software and utilities. The software includes Quarterdeck/StarNine's WebStar and a wide array of utilities. We did not test the current AISS offerings, as Apple will replace those products with new bundles in the near future.

Making the Connection The final platform issue you must settle is your physical Internet connection. For medium-speed digital connections, such as Leased-56, Switched-56, and ISDN lines, you can connect via your Mac's serial port to a data service unit (for Leased-56 and Switched-56) or to a terminal adapter (for ISDN). You must run a serial IP connection tool, such as MacPPP, to carry TCP/IP traffic to your access provider.

The serial-port approach may be inexpensive in the short term, as the hardware costs only \$300 to \$600, but can buy you problems down the road. First, unless you're running a Power Mac, your Mac's serial port likely can't sustain speeds in excess of 38.4 Kbps. Only Power Macs and some AV Macs have high-speed serial ports capable of 128 Kbps or more. You may not notice this problem until two or more users try to access your

server simultaneously. Second, even with a high-speed serial port, your Mac can get bogged down just handling the TCP/IP transport. A better approach to Internet connectivity is a stand-alone IP router connected via Ethernet. You need an Ethernet-capable Mac, but no special software. A router costs more—from \$800 to \$1500—but relieves your Mac of Internet-connection chores. A router can also provide automatic data compression, resulting in higher throughput, and can serve other machines on your LAN at the same time (see the sidebar “Planning for the Right Web Server”).

Which Software Is Right?

OK, all your hardware ducks are lined up, and you're ready to go shopping for server software. There are choices here, too. You can go with shareware or a commercial product, a Mac-oriented product or one descended from Unix lineage. You can spend a little or a lot. It all depends on your skills and budget.

Consider Performance To see how Mac Web servers stack up against each other, as well as against the Unix competition, we tested all the servers on a Power Mac 7500/100 under MacTCP. We also set up and tested a comparable Unix system (a 66MHz PowerPC 601-based IBM RS/6000 Model 250 running NCSA HTTPd). The commercial Mac products all fared well, although not as well as the Unix product; under a load of five simultaneous users, the Mac servers slowed noticeably while the Unix box hardly took heed (see the benchmark “For Speed, Unix Is Champ”).

The freeware and shareware servers suffered serious reliability problems under a five-user load, even when configured for the maximum number of users with 16MB of application RAM (httpd4Mac also failed with two to three users on the complex HTML document). They would crash unexpectedly when too many TCP connections were attempted. Of the commercial products, MachTen was fastest, followed by InterServer. WebStar ran nearly as fast, however, with much more polish.

Ease of Use If you're a Mac guru who loves to experiment, there are two shareware products on the market: Quarterdeck/StarNine's MacHTTP and Bill Melotti's httpd4Mac. Their names come from HTTPd, the HyperText Transport Protocol Daemon, which runs on Unix systems. Both products derive from the first widely available Unix Web server, the NCSA HTTPd, which we tested for comparison. True to their origins, these products get configured via Unix-style text files. There are lots of options to choose from, so the configuration files are large and confusing. If you make a typo, expect to spend a good deal of time diagnosing the problem; no friendly Mac-style error reporting here.

For Unix-at-heart Macintosh users, there are two extant versions of Macintosh Unix, Apple's A/UX and Tenon's MachTen. You should consider A/UX only if you're already running it for some reason (such as on an Apple server). But keep in mind that A/UX won't run on PowerPC hardware, so you're limiting your future expansion options.

If you just plain like Unix, but don't want to sell your soul



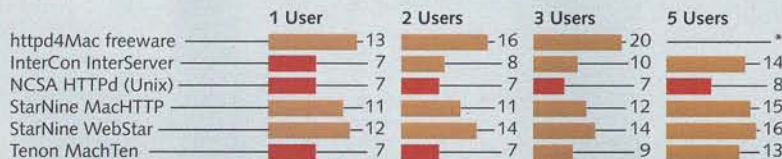
FOR SPEED, UNIX IS CHAMP

■ Best in test. Shorter bars are better. All times are in seconds. Products are listed in alphabetical order.

Mac servers tend to slow down with even a few simultaneous users, while the Unix server shows virtually no performance degradation even under the heaviest test load. This is likely due to the performance bottleneck imposed by MacTCP. Apple claims this bottleneck will disappear with Open Transport version 1.1. Our tests were not intended to stress each server to the breaking point; they looked at a moderate load (for Mac servers) of up to five simultaneous users continuously retrieving data. Two servers—MacHTTP and httpd4Mac—could not sustain even these moderate loads without crashing. Surprisingly, MacHTTP ran faster than its commercial descendant, WebStar, but speed counts for little if you don't survive the journey. InterServer was the fastest Mac server (aside from MachTen, which runs Unix on top of the Mac OS) but still showed significant performance degradation as the load increased.

Large-Graphic HTML Document

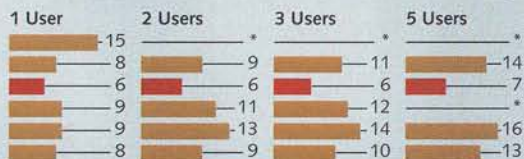
Time to download document with simultaneous, continuous traffic over one or two connections per user, including only one TCP/IP connection per user.



*Server failed.

Complex HTML Document

Time to download text-and-graphics document with simultaneous, continuous traffic over five or more connections per user, including at least five TCP/IP connections per user.



BEHIND OUR TESTS

For the Unix reference platform, we chose IBM's PowerPC-based 66MHz RS/6000 Model 250, because this system uses the same 601 PowerPC processor found in most Power Macs. We ran NCSA's freeware HTTPd server software because it's a popular package in the Unix world. We tested the Mac servers on a 100MHz Power Mac 7500 with 24MB of RAM and MacTCP.

Our test documents consisted of a set of HTML files containing text, graphics, and a mixture of text and graphics. We grouped the HTML pages by total size in bytes to form small, medium, and large test sets. We ran each server with one, two, three, and five simultaneous users running the Netscape Navigator 1.12

browser; we recorded the total time each test document took to download. We ran each test suite over a 10-Mbps Ethernet LAN, a 1.544-Mbps digital T1 connection, and a 128-Kbps ISDN connection. We found that performance was proportional between test sets of different sizes and over different network connections, so we report here only figures for the largest test sets, accessed via a LAN connection. We also found that performance for large HTML text documents is limited by the browser used, so we only report times for graphics-intensive and mixed-text-and-graphics documents.—Macworld Lab testing supervised by Mel Beckman and Lauren Black

SERVING UP WEB SERVERS

	Freeware	InterCon	Quarterdeck/StarNine	Quarterdeck/StarNine	Tenon
Product	httpd4Mac	InterServer Publisher	MacHTTP	WebStar	MachTen
Star rating ^a	★/1.4	★★★/5.2	★★/4.0	★★★★/7.3	★★★/6.3
List price	free	\$795	\$95 (shareware)	\$795	\$695
Phone	■	703/709-5500	510/649-4949	510/649-4949	805/963-6983
Common Gateway Interface	○	●	●	●	● ^c
AppleScript support	○	●	●	●	○
Apple events support	○	●	●	●	○
Open Transport capable	○	○	○	○	○ ^d
Configurable MIME types	●	○	●	●	●
URL suffix mapping	○	○	○	●	●
Access Security					
Realm control	○	●	●	●	●
Allow/deny control	○	●	●	●	●
Multiple Domains					
Multiple servers	○	○	●	●	●
Multihoming	○	○	○	○	●
Performance Controls					
Threaded execution	○	○	○	●	●
CPU usage	○	○	●	●	●
Other Protocols Served					
FTP	○	●	○	○	●
Gopher	○	●	○	○	●
Image maps	○	●	●	●	●
File aliases	○	●	●	●	●
Folder indexing	○	●	○	○	●
Access logging	●	●	●	●	●
Remote administration	○	○	○	●	●
Comments	Minimalist freeware: feature poor and unreliable.	Fast and functional, but missing key features and documentation.	Capable shareware, but unreliable under heavy load.	Polished, capable, reliable, easy to use, and reasonably fast.	Fast, but hard to use, requiring Unix administration skills.

● = yes; ○ = no. ^a Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ^b No phone; download from

<http://sodium.ch.man.ac.uk/pages/httpd4mac/home.html>. ^c Can execute C and PERL programs or shell scripts within its own Unix environment. ^d Includes TCP/IP support that requires MachTen to be running before any other Mac TCP/IP application. Open Transport can be run simultaneously on a separate network card.

(or your Mac hard drive) to it, consider MachTen, which runs as an application under the Mac OS. MachTen consumes prodigious amounts of disk space (plan on 100MB) but comes with a built-in Web server (NCSA HTTPd). Although you configure the Web server with text files, just like any Unix server, because you're running inside a full-fledged Unix environment you can use all the same tools and accessories enjoyed by the big Unix boys and girls.

If you're not an expert and just want to get a reliable server up and running, go straight to the commercial products. At this writing two are shipping—WebStar and InterServer Publisher—and more are on the way from other vendors. You get reliable, easy-to-use products with telephone and electronic technical support, and more features than the shareware cousins offer.

Features You Need Speaking of features, price and support shouldn't be your only selection criteria. After all, you're spending a fair sum on hardware and Internet connectivity, not to mention the investment of time to get everything set up. Consider some features that might be important in your application, and make sure your server choice supports them (see the table "Serving Up Web Servers").

The most important feature, if you're planning on doing any back-end processing, is Common Gateway Interface (CGI) support. CGI lets your HTML document invoke Macintosh programs and scripts to process user information, such as a query request, and return results, such as a database extract. To their credit, the commercial products we tested all include sample CGI scripts, and you can find a wide range of others online. WebStar's excellent CGI library puts it above the competition, however. InterServer Publisher has CGI examples, but you have to go look for them, as the documentation has not a word on the subject.

Other important features are configurable MIME (Multi-purpose Internet Mail Extensions) settings and URL suffix mapping. When delivering data to a browser, your server passes along the type of data—text, GIF or JPEG graphics, sound, video—so the browser can present the data appropriately. MIME settings and URL suffix mapping let you configure your server to support new kinds of data as they become available. For example, if you want to serve PDF files, you can establish a MIME type for Macintosh PDF files, or an URL suffix map for file names ending in .pdf, so that browsers are informed when

you're delivering a PDF file. WebStar and MachTen support suffix mapping, although WebStar is the only one with a GUI configuration interface with the feature. InterServer Publisher and httpd4Mac lack the feature.

Access security is another capability you should consider carefully. Servers with access security usually support one or both of the standard Web features, realm control and allow/deny control. With realm control, you organize folders and documents into groups called realms. You can create a list of authorized users and passwords and grant them access to particular realms. When users try to access a secured realm, their browser prompts them for a user ID and password.

In contrast to realm control's active protection, allow/deny control manages access passively, based on the user's IP address or domain name. This lets you control access at the server level,

based on where the request originates. Both kinds of security controls are useful, and you'll probably want both. All the products except httpd4Mac have realm and allow/deny control, although WebStar and InterServer Publisher are the only products with a point-and-click security interface.

If you want your server to support more than one organization, two features—multiple servers and multihoming—will be important to you. Multiple-server support lets you run two or more copies of the server software on the same Mac. Users must access these servers through different TCP ports and must include the port number in their URL if it differs from the default of 80. For example, you might run a public server on TCP port 80 and a private server on port 5555. Users would use <http://www.yourcompany.com> to access the public server and <http://www.yourcompany.com:5555> to reach the private one.

WORLD WIDE WEB-SERVER SOFTWARE ACCESSORIES

Third-party vendors offer a wide range of utilities that complement Mac-based Web servers. For many specialized needs, these add-ons can be essential to the success of your Web site. Here are a few of the most notable to consider.

OpenDoor's HomeDoor (\$279 through March 1, \$399 thereafter; <http://www.opendoor.com/HomeDoor/HomeDoor.html>). OpenDoor brings HTTP multi-homing to any MacTCP-compatible Web server. This patch to MacTCP lets you assign an individual Macintosh up to 255 different IP addresses, and you can map those addresses to specific URLs in the server. This lets you support multiple, unique domain names of the form www.companyname.com, so that each name appears to have its own private Web server. HomeDoor only works with TCP port 80, the standard HTTP port, but OpenDoor says the company eventually hopes to support additional ports for servers such as FTP and Telnet.

Maxum Development's Net-Cloak and NetForms (\$195 each, <http://www.maxum.com>). This duo extends your Web server by adding new HTML commands and letting users add content to your server. Net-Cloak adds some 30 proprietary commands that execute just before the server transmits an HTML document to a requesting user.

The commands let you include dynamic real-time information in a Web page and let you perform conditional tests to generate custom Web pages. Users enter data into forms you've created, and NetForms generates HTML pages from that data and stores those pages on your server, letting you archive threaded discussions or construct other interactive services as your needs evolve.

EveryWare Development's ButlerLink/Web (free, <http://www.everyware.com>). This freeware tool lets you create forms to query, update, insert, and delete records in a Butler SQL (structured query language) database. (It requires Butler SQL, also from EveryWare.)

Russell Owen's FileMaker Pro CGI (free, <http://rowen.astro.washington.edu>). This freeware tool offers forms-driven access to Claris's FileMaker Pro flat-file database.

All of the database-configuration information remains stored in your HTML document; there is no need for ancillary files.

Foresight Technology's Net-Link/4D (\$189, <http://www.fsti.com/weblink.html>). This external package for 4th Dimension accesses 4D databases via CGI.

University of Minnesota's Web66 (free, <http://Web66.coled>

www.umn.edu/). This useful accessory is a World Wide Web cookbook full of useful techniques and downloadable utilities for Mac Web servers. You'll find step-by-step instructions for everything from soup to, um—well, you get the picture.

Jon Wiederspan's Mac WWW Development Guide (free, <http://www.comvista.com/net/www/WWWDirectory.html>). Another Web resource, this exhaustive collection of Mac Web pointers gives you one-stop shopping for everything Mac about the Web.

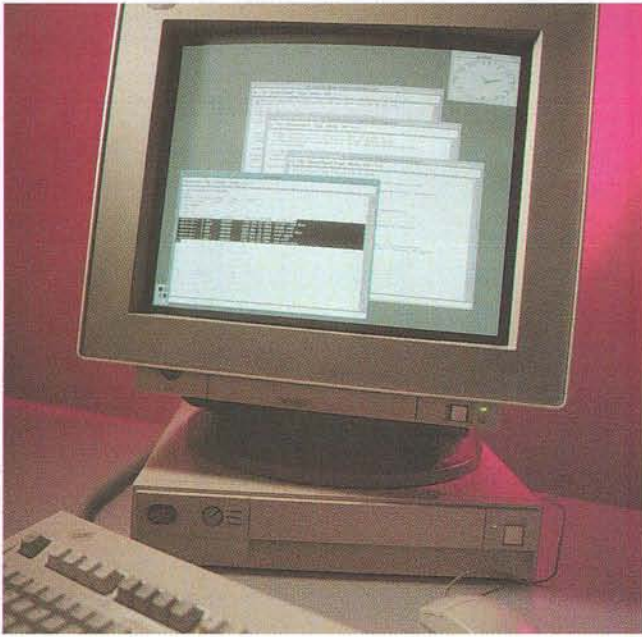
Column name	Data type	Length	Dec.	Column title	Initial value
conf_id	Integer	4		conf_id	0
conf_name	Char	32		conf_name	
conf_desc	Char	255		conf_desc	

Column name	Data type	Length	Dec.	Column title	Initial value
msg_id	Integer	4		msg_id	0
msg_subject	Char	30		msg_subject	
msg_content	Char	255		msg_content	

Column name	Data type	Length	Dec.	Column title	Initial value
user_id	Char	15		user_id	
user_password	Char	30		user_password	
user_first	Char	15		user_first	
user_email	Char	30		user_email	
user_url	Char	30		user_url	
user_last	Char	15		user_last	
user_abo	Char	15		user_abo	
user_plo	Char	15		user_plo	

Table	# Rows
conferences	4
counter	2
messages	48
topics	0
users	137

Full-Fledged Database Everyware Development's Butler SQL database server is a standards-compliant relational database with CGI tools for manipulating database records using structured query language from within your HTML documents.



GARY MOSS

The Unix Contender This 66MHz PowerPC 601-based IBM RS/6000 Model 250, running NCSA HTTPd, beat the Mac in speed tests—but at a high price in features and ease of use.

Multihoming lets you run servers with completely different domain names, such as *www.acme.com* and *www.coyote.com*, by giving each domain a separate, unique IP address. MacHTTP, WebStar, and MachTen all let you run multiple servers. Currently only MachTen, the Mac Unix server, supports multihoming, although you can add the capability to native Mac servers using a third-party product called HomeDoor (see the sidebar “World Wide Web-Server Software Accessories”).

Performance Controls The last major feature set is performance controls. Because the Mac OS doesn’t support preemptive multitasking, you may have problems running a server with many simultaneous users or with CGI programs executing in the background. Two features help here: threaded execution and CPU-usage limits. Normally, when a single HTTP request comes in for a particular HTML element (such as an icon), the Mac server must completely process that request before it can take the next one, slowing access for other users. The Mac OS now has built-in support for threaded execution, which lets a single application, such as a Web server, do more than one thing at a time. In this case, threads let the Web server accept and process HTTP requests in parallel. Only WebStar and MachTen support threads.

A related problem is balancing time between Web server and CGI program execution. It’s possible for a Web server to hog the CPU so CGI programs get very little time to execute. The resulting glut of slow-running CGI programs can bog down the whole system. A server that can limit its CPU usage to a predefined value mitigates this problem, ensuring that CGI programs get enough time to execute quickly. MacHTTP, WebStar, and MachTen have this capability.

A slew of other features may or may not be important to you. Image map support lets you put clickable images in your Web pages. File aliases enable you to put Macintosh alias files into your Server folder to reference data elsewhere on that vol-

ume or on another mounted volume. Folder indexing automatically creates HTML indexes of whole folders to simplify serving many files. Access logging records every user transaction for later statistical analysis. InterServer Publisher and MachTen include add-on servers for FTP and Gopher. These are worthwhile additions if you are planning to set up a complete Internet presence.

Each product has its strengths and weaknesses. MacHTTP is feature laden and well documented, but fails under a heavy load, ruling it out as a serious commercial server. InterServer Publisher, while fast and functional, lacks important features, such as suffix mapping and configurable MIME types.

Bill Melotti’s httpd4Mac is a valiant effort at minimalist shareware, but with virtually no features httpd4Mac can do little more than deliver simple Web documents. MachTen is actually an entire Unix implementation that happens to contain a Web server (NCSA HTTPd). Because it is real Unix with an embedded C compiler, it can run any Unix-originated CGI program in just about any language. Because MachTen has its own TCP/IP stack that replaces both MacTCP and Open Transport (with good results), it supports multihoming. But don’t even consider MachTen unless you have some basic Unix-system-administration skills.

WebStar is a polished product with a rich feature set. It delivers on everything it promises: complete, clear documentation; point-and-click configuration; and a knowledgeable, focused telephone technical-support staff. Hence WebStar deserves our Editors’ Choice designation.

The Last Word

So is the Macintosh ready for prime time in the Web-server market? Most certainly. A Macintosh-based Web server is economical, easy to set up, and relatively simple to maintain. The Mac’s native AppleScript and Apple events enable you to build powerful back-end processors for delivering complex content.

Is the Mac the ultimate Web-server platform? No. The lack of preemptive task switching and limitations in TCP/IP implementation put the Mac well below the performance level of Unix-based Web servers for now (though once it fully supports Open Transport, the Mac should finally leave performance inferiority behind). But if your site doesn’t need to serve dozens of users simultaneously, the Mac’s attractive price and ease of use make it a great choice. ■

MEL BECKMAN (mel@becknet.com), a consulting network engineer, sets up new Internet service providers. He regularly evaluates Web servers for Mac, PC, and Unix systems. Look for his experimental Mac-based Web server at www.becknet.com.

WEB SERVER SOFTWARE



EDITORS' CHOICE Speed is a key Web-server attribute, but it's useless without a broad range of features and ironclad reliability.

★★★★/7.3 **WebStar** It isn't the fastest Mac Web server we tested, but it has important features other servers lack: suffix mapping, file aliases, Apple events, remote management, multiple-server support, and threaded execution. WebStar's good performance, features, and reliability offer a winning combination. **Company:** Quarterdeck/StarNine. **List price:** \$795.

STAY ON THE WEB

MAKE YOUR INTERNET SITE PAY OFF

Who would have thought that the anarchism of the Internet would prove so attractive to corporate America?

The Net is as raw as any frontier—difficult to regulate effectively, unpredictable, and fueled by idealism and the spirit of exploration. Still, the lure of profit has turned tens of thousands of small entrepreneurs and mainstream, conservative businesses alike into virtual homesteaders, prepared to absorb losses today to harvest big rewards in cyberspace someday.

What does the Net offer business right now? Not a developed market, but attractive market potential. Not a polished sales channel, but a rough and powerful system that can be shaped to fit a variety of needs. In a leaner, harder global economy, the Internet is a new conduit for communications—it thrives on the entrepreneurial energy behind many dynamic companies. Bringing your business to this global network extends your reach and gives you access to a wealth of information with relatively inexpensive technology.

But turning promise into productivity and profits just isn't as easy as plugging your LAN into the Internet or setting up a Web server. To integrate the Internet into your

business, you need a cohesive approach that fully maximizes your chances to improve on your investment.

The framework for success varies from company to company and is in a state of constant flux, but a wide range of businesses have begun to understand how a combination of automated E-mail and effective Web sites can help a company reach new customers, stir up interest in its products and services, and even ultimately reduce its overall workload.

Start with Automated E-Mail

Because it is easy, fast, cheap, and efficient, automated E-mail is usually a good place to start your business Internet presence. Similar to a fax-on-demand system, an automated E-mail server generates an instant response, sending product or service information directly to your customers. E-mail is cheaper than a long-distance phone call, it is more flexible than a fax, and it allows you to send in seconds a 150-page document that might otherwise have required FedEx delivery. All these things save you money and can create a strong online presence that encourages interaction

BY MATTHEW HAWN

and a more responsive business environment.

This service can easily be arranged by your Internet server provider (ISP). Or if you already have your own server, look at ListStar, from Quarterdeck/StarNine Technologies (510/649-4949, info@starnine.com; \$499 for SMTP version, \$199 for POP version). WebStar, the company's Mac Web server software, combined with ListStar, provides the easiest and most effective solution for Mac-based Web servers (see the feature "Get On the Web," elsewhere in this issue). It's a relatively simple matter to update information quickly, add more E-mail addresses, and get timely information to your customers 24 hours a day.

The biggest drawback to E-mail servers is the way your information is displayed. You are limited to plain text, and you can't offer graphics easily. E-mail bounce-back doesn't offer the flexibility of a good Web page. Once the exclusive playground of the technically adept, the Web is coming to the desktop, in

much the same way that publishing did in the mid-eighties (for a primer on Web publishing, see "Build Your Own Home Page," *Macworld*, November 1995).

Web Advertising and Marketing

As appealing as automated E-mail can be, it barely taps the Internet's potential as a way to communicate and build a business. For big companies, a corporate Web site is becoming a business necessity, while small companies are beginning to realize the Web's potential to reach new customers and even to compete more effectively against larger companies.

A Web page is accessible from networks all over the world, 24 hours a day. Thanks to HTML's simple standards, the Web reaches most users, without regard to platform. You can also factor out major distribution expenses, such as for printing and mailing, reducing your overall expenditures as well.

The key to a successful Web site involves combining easy navigation and attractive graphics with interaction, and spicing up your image with enticing premiums or nov-

Valentine's Day. Godiva collaborated on the design and implementation of the site with a contractor that updates the message and handles the mechanics of the site with a staff of three to four people at any given time.

The Web has the potential to reach an extremely lucrative demographic audience: most surveys suggest that people who browse the Web are well educated and have lots of disposable income. Even if you never intend to sell online, you can reach many customers who are likely to buy your products offline. While Godiva realizes no profit from direct sales online, the company attributes a marked increase in in-store sales to the Web site.

Nolo Press publishes self-help legal books and software, a market that has traditionally relied on printed catalogs to sell products. Nolo now runs a Web site that publishes in-depth features and news to complement and enhance its offerings. The company recognized that its audience closely parallels the developing demographics of the Web—well educated, do-it-yourselfers—and that a simply designed site, rich in legal informa-



elties to keep customers coming back again and again.

Godiva Chocolatier offers a good example of the current state of advertising on the Net. The Godiva Online Web site (<http://www.godiva.com>) offers online shopping via a digital catalog, product descriptions, and information on the company's many stores all over the world. This material simply mirrors the company's print catalogs, but the site also offers recipes and stories and a clever E-mail-based gift-reminder service that can prompt you to buy truffles for your sweetheart two weeks before

tion, would stimulate interest in the company's books and software. A small staff (one full-time person and three part-time people) manages the Web site and online areas on eWorld (shortcut: *Nolo*) and America Online (keyword: *Nolo*). Like Godiva, Nolo has yet to break even on its investment in the Internet, but the company has been encouraged by the steadily increasing number of orders that it takes over the Internet and views the site as a successful marketing tool that will eventually develop into a significant profit center.

Making Your Web Site Effective

A good Web site can open up a whole new market for you, but remember, increasingly the opposite is also true. A poorly designed site can drive people away in droves. The Web is a new kind of medium. What works in print or television may fail abysmally online. A good Web site is not unlike a successful piece of software: both need an intuitive interface, a coherent design, and absolute reliability.

Not surprisingly, software companies have some of the best-designed advertising sites on the Internet. Berkeley Systems'

Web site, Toasted (with reference to the company's flying-toasters screen saver, <http://www.berksys.com/>), offers graphics and current information on the company's products, plus customer support, downloadable demos, and free software. Toasted was designed in-house, and a part-time staff of eight maintains the site in addition to doing other jobs at the company.

The site's strong visual sense matches the company's products and aesthetic while taking some chances with new technology to stand out from the crowd. For instance, Toasted recently produced a 1940s-style radio show called Toast Opera with a

TEN STEPS TOWARD A SOLID NET PRESENCE

To stand out from the hordes of businesses arriving each week on the Internet, you need to create a strong online presence. While akin to image advertising, which attempts to create a personality for your business, a company's Internet presence should do more. To gain the respect of people who use the Internet, your business needs to participate and interact with the Internet's culture and accepted practices. And your site should reflect that. Here are ten steps that will help you get started.

1. Encourage interaction. Include E-mail addresses and forms for suggestions, kudos, and complaints. In some cases, it may even be appropriate to post visitor responses in an area of your Web site. Be sure to respond within 48 hours, even if it's just to say that you received the message.

2. Start small and grow. Trying to create an epic site in one fell swoop can make your site feel prefabricated and false. Let it grow

and find its own shape gradually.

3. Dedicate adequate resources. The Web is an ongoing project and requires cultivation and dedicated staffing. An unresponsive or unreliable Web site is worse than no Web site at all. The Web is a 24-hour service and most sites need three to four regular (though not necessarily full-time) gardeners, including a technician to tend the Web server.

4. Foster personality. Remember the people behind your site. Personal pages are some of the most commonly hit pages on business sites. They give your venture a human face.

5. Surf early and often. Take the time to explore the Net and learn its history and customs. Encourage your staff to be active in online forums that relate to your business. This can help build your reputation online. When posting to newsgroups or responding to E-mail, your staff should include your firm's Internet address(es) as part of their signature.


6. Contribute to the Web's interconnectivity. Add value to your site by providing links to other Web sites that relate to yours. If you sell fishing lures, link to a page that details the National Parks' best fishing spots. The owners of those sites may in turn link to your site, generating more traffic.

7. Respect your visitors' time. Most people make online connections from home via a 14.4-Kbps modem, so keep your site's graphics small and easy to download. Expedite visitors' ability to find what they want at your site with good navigation and search tools (see the screen shot "Text-Only for Fast Loading").

8. Update your site regularly. Web pages are always under construction; viewing them as works in progress increases the creative dynamism of your site. Elements that change regularly—a joke of the day, or offer of the week—will increase your online traffic.

9. Sponsor contests and online-only promotions. A sure way to attract more visitors is to give things away. A monthly premium, free promotional materials, and special online sales can greatly increase attention to your Web site. Make your contests interactive and fun—ask visitors to answer trivia questions or write a short E-mail essay, for example.

10. Make your Web site URL as commonly known as your phone number. Promote your site address on your business cards and advertising. You can do this online by registering your site with Internet directories, such as InfoSeek (<http://www.infoseek.com>), Yahoo (<http://www.yahoo.com>), and WebCrawler (<http://webcrawler.com>).


Nolo Press
Product Catalog

Books, Software, Audiotapes and T-Shirts

- Business and Workplace — Business law A to Z, including start-up partnerships, corporations & trademarks, workplace rights & fringe benefits
- Estate Planning — Wills, trusts, living wills & more
- Family Matters and Seniors — Couples, kids, adoption & divorce, Social Security & long-term care
- Homeowner/Landlord/Tenant — Buy, sell, rent, and protect your home
- Immigration — Green cards & citizenship
- Intellectual Property — Establishing & protecting intellectual property
- Just for Fun — Humor books, toys, T-shirts
- Money and Consumer Matters — Consumer rights, consumer protection, credit, debts, insurance, taxes, bankruptcy & more
- Represent Yourself in Court — Representing yourself in small claims, civil & traffic court

Get printable order form — If you'd rather not order online, you can print out an order form and mail it or fax it to us.

View shipping and handling policy — There are lots of ways to get our product to you; you can tell us what works best for you.

How to reach us — Comments, suggestions, problems? No matter what, we'd love to hear from you.

Nolo Press No-Hassle Guarantee

Text-Only for Fast Loading Nolo Press (<http://gnn.com/gnn/bus/nolo/>) uses a simple—mostly text—design that loads quickly even at 14.4 Kbps. It's organized by subject, and the lower half of the screen features links to ordering, policies, and contact information.

serialized story in streaming digital-audio formats like RealAudio from Progressive Networks (206/447-0567, support@prognnet.com; prices vary) and TrueSpeech from the DSP Group (408/986-4300, webster@dspg.com). Such clever and original content keeps visitors coming back.

Experimenting with the Web can be a great way to learn about this new medium, but you should judge the value of new technology like digital-audio radio in the context of your business, not only for its gee-whiz factor. Choose the technologies that complement your business. If you sell toothpicks to restaurants, it probably doesn't make a lot of sense to bother to provide digital-audio files on your Web site. On the other hand, for a publisher of books-on-tape, an audio component could be a tremendous selling point. Sample clips from your best-sellers or your new titles could draw repeat visitors who want to stay up-to-date.

When Hot Hot Hot, a small store in Pasadena, California, decided to advertise some of its spicy foods online, it worked with a contractor to create a fun Web site. The interface is bright and colorful, matching the store's style, while allowing visitors to view the products in variable layouts (see the screen shot "Spicy Views"). In addition to online shopping options, Hot Hot Hot runs contests and includes E-mail links for customer feedback. The company uses that feedback to make changes in its product offerings—recognizing the Web's capacity to provide instant and continuous marketing data about what works and what fails.

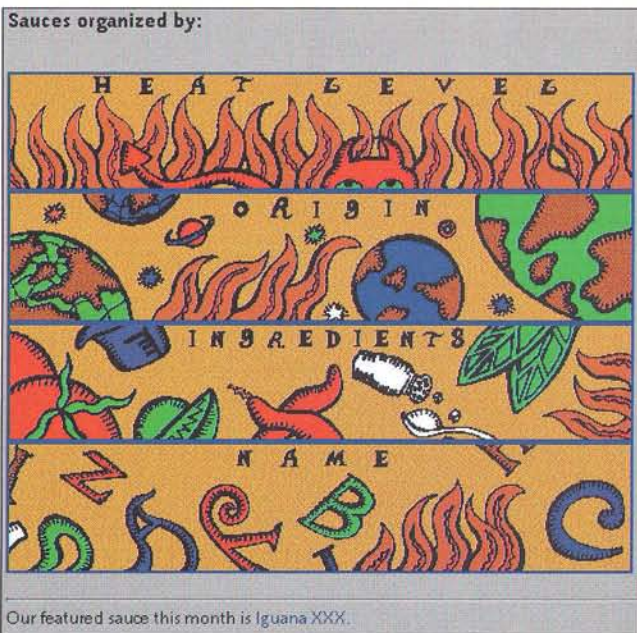
Another potential benefit of an Internet business site is the ability to gather information about your customers via surveys and contests. But be careful. The Internet community frowns on unsolicited advertisements and even perceived breaches in privacy. Selling your E-mail mailing lists to others or sending promotional E-mail can get you into trouble fast with customers or even bring on a deluge of flames. Surveys and feedback forms that respect your visitors' privacy, however, can help you get good information on the services that your customers want. Consider surveys that don't ask for detailed personal information, and always be very clear and open about what you intend to do with the information you gather.

From Sales to Profits

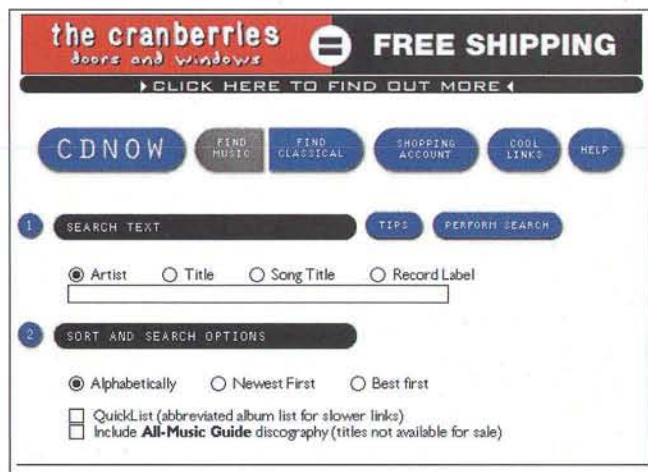
These techniques work well to build awareness of your products and communicate with customers, but be realistic about your investment. Few companies have figured out how to sell products online, possibly because few consumers have become comfortable buying online as yet.

Bear this in mind as you develop your Web business plan: it could take quite a while to recoup initial costs. Techniques for connecting your business to the Internet vary widely. If you choose to host and maintain your own server, look to spend anywhere from \$5000 to \$20,000 on hardware, including the server, router, and extra RAM. Setting up an Internet connection runs from about \$1000 to \$5000, plus monthly line costs of \$100 to \$2000, depending on the speed of your connection (see "Get On the Web").

Some ISPs offer colocation services for Internet servers, which cost about \$1000 to set up, with monthly fees from \$1000 to \$2000 for access to T1 connections. You lose a lot of flexibility with a colocated server and have to rely on remote access to make most changes to your site.



Spicy Views Hot Hot Hot Online (<http://www.hot.presence.com/hot/>), an online catalog dedicated to hot, spicy food and chilies, run by a small retail shop, offers flashy graphics and multiple views of product information to draw customers in.



Easy Search Tools CDnow's (<http://cdnow.com>) search interface allows fast and straightforward searches for the company's CD titles by artist, CD title, song title, or record label, and sorts the results according to your tastes. The results are then hyperlinked to more information and graphics that relate to the topic.

If you don't have a Web expert on staff, expect to pay consultant fees of \$100 or more per hour. At start-up, consulting fees will range from a few thousand to tens of thousands of dollars as you design the information structure of your site. Designers who understand the graphics needs of the Web will charge similar fees.

And while Macs have an inherent security advantage over more-open Unix systems, if you plan to put sensitive information on a Web server that's accessible over the Internet, add the cost of a security consultant who can help you protect your data from prying eyes.

In the long run, your largest expense will be staffing. A large,

multifaceted site requires at least one full-time employee and two to three part-time staff to help with updating and maintenance. Experienced Web masters are paid anywhere from \$30,000 to \$80,000 per year.

So it's easy to see that crossing over to profits after these expenses can take a while. Most companies with a Web presence view it as a long-term investment in a new market or as a worthwhile marketing venture. As they gain experience and build their Web reputations, they expect profits to eventually follow. Others are content to treat the Net as an electronic newsletter for the time being, experimenting with this new medium's rhythms and patterns.

A handful of companies have taken the plunge and are investing in the Web as a primary sales channel. CDnow, one of the first companies to set up a virtual storefront on the Internet, sells compact discs, videos, and other music products. Key to its

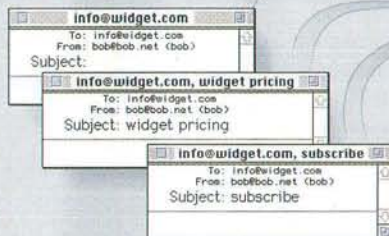
why you want to be on the Net and what resources you can dedicate to your Web site. Be modest at first but build your system for easy growth.

The most thoughtful business plans also exploit the Web for internal company use. Focusing inward, a rapidly growing number of companies use in-house Web sites as an extension of their LANs and WANs, in pursuit of alternatives to more expensive options like Lotus Notes or inadequate office E-mail products. Using HTML and the basic Internet mail protocols as core technologies, these companies are experimenting with shareware and inexpensive Web browser software to distribute hyperlinked human-resource documents and training materials (like interactive job listings), while providing a centralized site for electronic data. And software developers are taking notice. With its recent purchase of Collabra Software, a collaborative-discussion company, Netscape

E-MAIL ON DEMAND

Automated E-mail—based on dedicated Internet mail packages such as StarNine/Quarterdeck's ListStar, standard E-mail programs such as CE Software's QuickMail, or custom options from Internet service providers—offers 24-hour customer service similar to that of a fax-back system. On-demand systems operate by filtering keywords in the subject line or body of the sender's message, then responding based on a series of preset rules. In this example, a widget company provides product information and marketing materials, and automates mailing-list functions for regular correspondence.

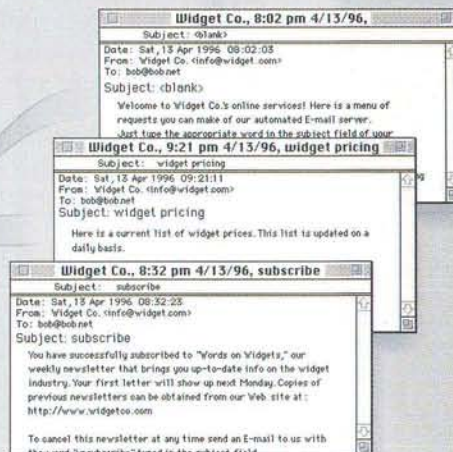
Messages from customer



widget.com server



Responses to customer



strategy is a searchable database of nearly 200,000 products located in four different warehouses. Equally important is the flexibility of CDnow's interface, which displays search results by artist, genre, or title (see the screen shot "Easy Search Tools"). CDnow adds value to the service by including a music guide and a regularly updated online magazine that encourages shoppers to learn about the artist and the genre. CDnow has a staff of 14 people; 4 of them are dedicated to design and programming for the Web site. The company is so confident in the growth of the Web that it plans to nearly double its staff in coming months. CDnow is also one of a handful of companies willing to invest in advertising links on other Web sites to increase traffic and, hopefully, sales.

The Last Word

A successful Internet presence, like any successful business, starts with a solid plan. Many businesses launch a Web site without the resources to support its maintenance and growth. First decide

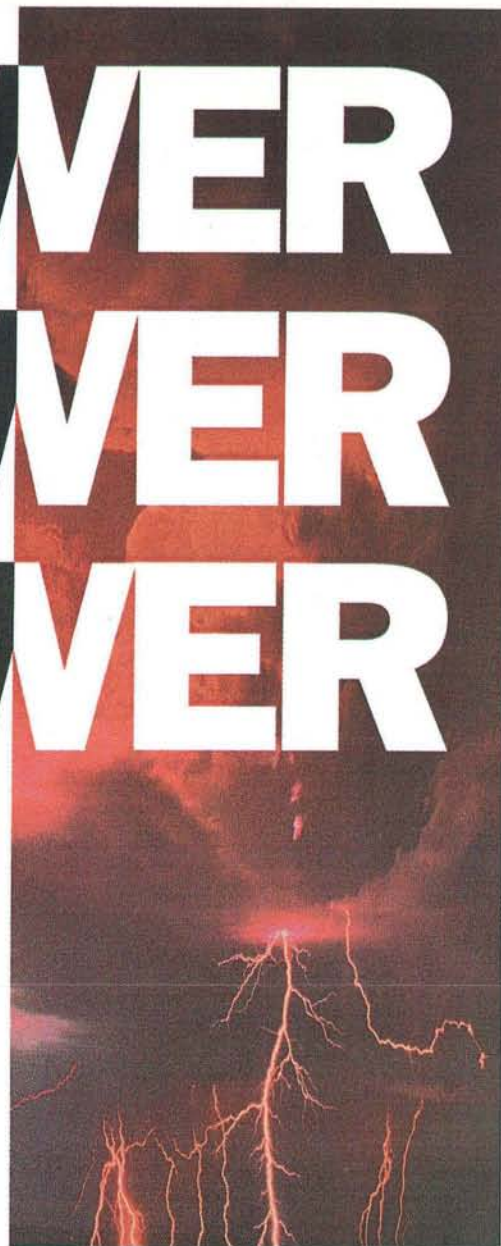
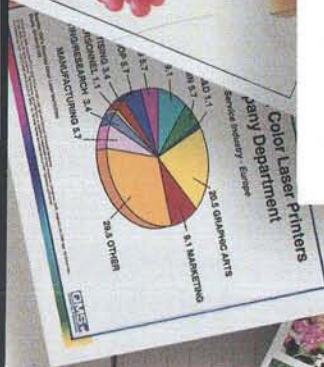
Communications is aiming squarely at the groupware market, and you can expect other entries into this new software market later this year.

With few exceptions, the most successful business sites on the Net are sticking to basic HTML and eschewing the Netscape and Microsoft extensions to the 2.0 HTML standard (see the *NetSmart* column elsewhere in this issue). By doing so, these sites reach a wide audience on all platforms.

In the end, the most savvy companies using the Internet have developed their Net presence organically, learning and adapting to this rapidly changing medium. They budget high enough to show a solid Web presence and weather the frustration of evolving technologies and standards. And they'll be among the first to reap the Web's rewards. ■

MATTHEW HAWN (matthew@www.macworld.com) is production editor for Macworld Online and produces Radio Macworld and GameLine for the Macworld Web site.

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Are you getting the performance out of

New Back-UPS Pro™ increases productivity and peace of mind.



If you're using a computer, few things are more certain or more discouraging than power problems. If you haven't yet lost productivity and data to a blackout, crashed a hard drive, or

toasted a modem, you will. It's almost a statistical certainty.

More than 4,000,000 smart computer users protect against the inevitable with affordable: award winning power protection from APC. One prevented problem is all it takes to pay for proper power protection many times over.

Back-UPS Pro, protects all power paths leading to your Mac, keeping your equipment safe from power events including surges, swells, brownouts, and blackouts - and keeping you safe from downtime that power problems inevitably produce. Back-UPS Pro provides high-performance workstation protection, preventing data loss, increasing your system's lifespan, and improving productivity.

Unprotected computing is risky business

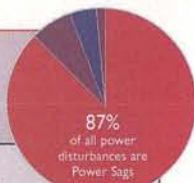
Chance of your computer being affected by power problems: 30 in 100

Computers are 24 times more likely to be hit by power problems than cars are to be stolen, or homes are to be broken into. Yet, they currently are 10 times less likely to be protected against such occurrences.

Source: 1993 Uniform Crime Reports, Federal Bureau of Investigation; APC estimates

Chance of being Burglarized: 1 in 100

Chance of your car being stolen: 0.6 in 100



Back-UPS Pro allows you to work through power problems that would normally shut other UPSs down. Most UPSs begin to drain battery at the onset of sags. Back-UPS Pro's Automatic Voltage Regulation corrects low voltage conditions without unnecessary battery drain.

computer. Automatic Voltage Regulation allows you to work through power problems by increasing voltage during brownouts and decreasing voltage during surges without draining battery power. In environments where chronic brownouts and overvoltages are the norm, the line-interactive Back-UPS Pro is essential.

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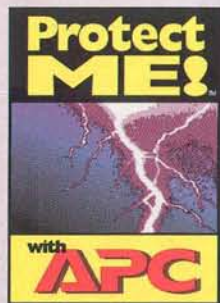
- Instantaneous battery backup to protect your data against a total loss of power.
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So don't wait for the school of high shocks to teach you an expensive lesson about Mac performance. Ask for APC today.

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A study by Bell Labs indicates that 87% of all power disturbances come in the form of a power sag, or "brownout." Most UPSs begin to drain battery at the onset of sags, giving you a few moments to shutdown your



MORE THAN 4,000,000 SATISFIED USERS SAY "PROTECT ME! WITH APC"

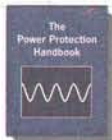
CLOCKWISE: "After 13 plus years in the computer industry (with both Apple and Digital), I have changed directions and now live in the Santa Cruz mountains, where the power is as bad as the view is beautiful," says Harold Striepe. "Now I spend most of my time consulting and writing fiction. The power is the worst during rainy season and brownouts are a daily occurrence. But, not a problem for me since I got my Back-UPS Pro with AVR - now, I work through the rainstorms."

"I am the Product Development manager for Radio Flyer," says Antonio Pasin. "But quite often, I work at home, where I pay for all the equipment...my TV has been zapped in the past (it turned GREEN!). Here, I don't have an extra \$1200 to replace the DAT tape backup...an investment in APC is more cost effective for me. But besides just protecting the hardware, I look at it as protecting my media...I have lots of time invested in my data, and Back-UPS Pro protects that as well. Not to mention the unit is well-designed, easy to use, and APC provides great customer service to boot."

"I am a graphic designer/illustrator, using mostly 9500i/32 and 8100/80 PowerMacs, in central Florida, the lightning capital of the world," said Thomas Sessions of Sessions Design in Orlando. "We lose power on a weekly basis and have constant outages...I've used APC for at least 8 years, but Back-UPS Pro is my current favorite - it has a smaller footprint and I can plug in my modem. Before UPSs, when we heard a thunderstorm, you would just hurry and try to get the work done, then just shut down-unplug the machines and take a break...now I wouldn't work without one...particularly in this deadline oriented industry."



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playing with fire."

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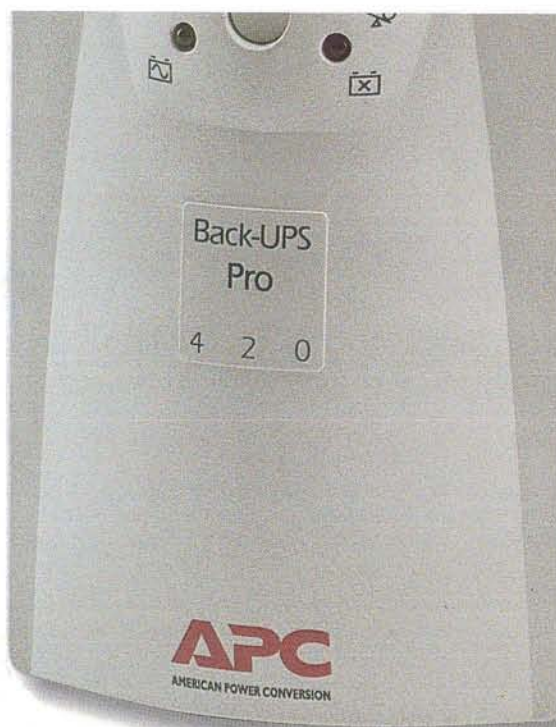
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Back-UPS Pro 1400	1400	\$759



Back-UPS: Basic Mac Protection
Perfect for Performa

Model	VA Rating	List Price
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Back-UPS 280	280	\$139
Back-UPS 400	400	\$199
Back-UPS 450	450	\$254
Back-UPS 600	600	\$359
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The Right Tools for the Job

M A C W O R L D

EXPERTS PICK THE BEST PRODUCTIVITY

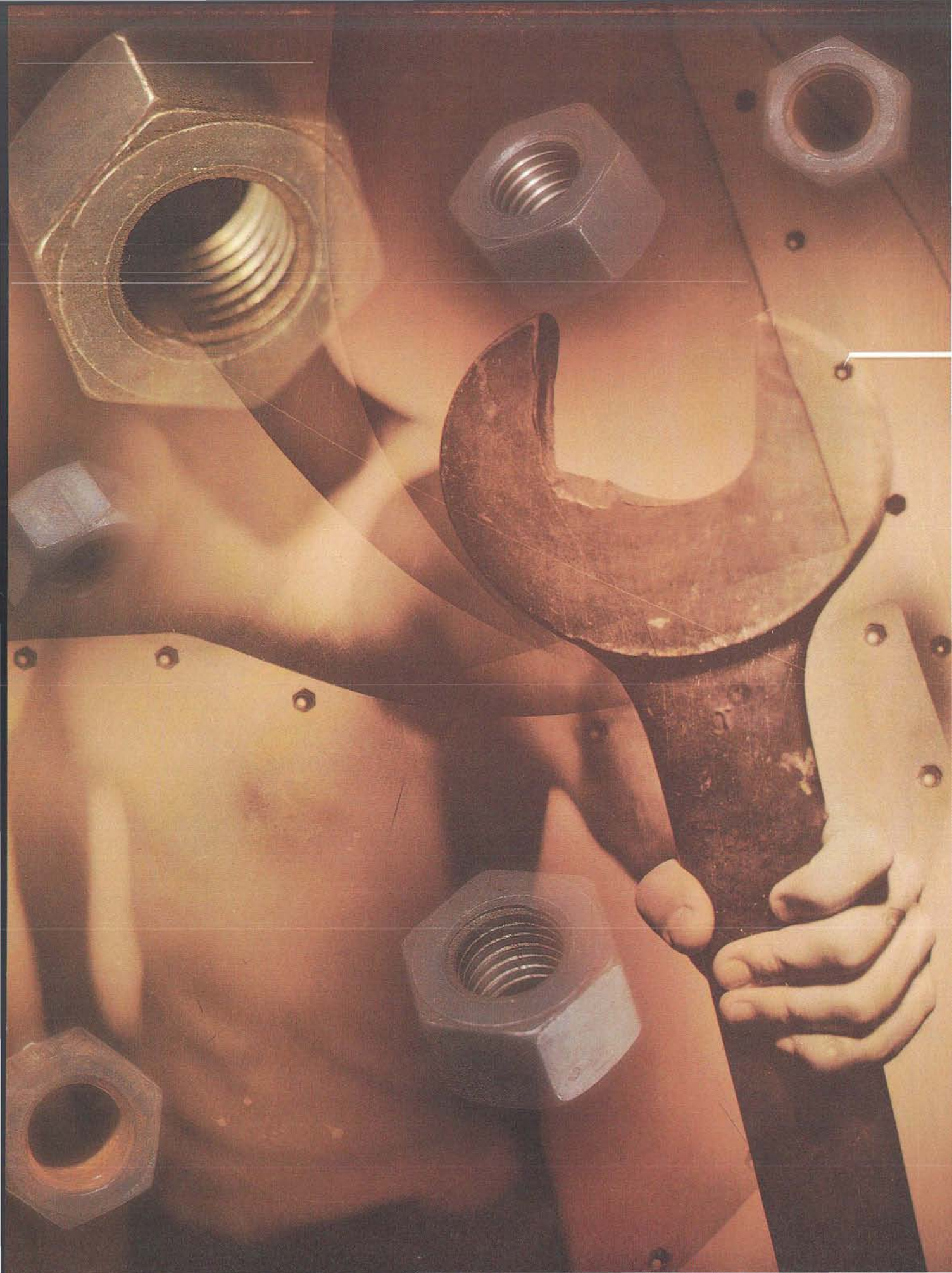
BOOSTERS

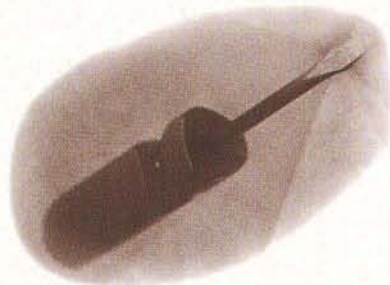
HAVE YOU EVER FOUND YOURSELF WITH FIVE Phillips screwdrivers when what you really needed was a flathead? The old cliché applies with tools: a miss is as good as a mile. And that goes for utility software too. Without the right utility, what should be an easy job can be an onerous—even impossible—task. Having the correct utility is like hitting the nail on the head after years of bent brads and bruised thumbs. The right utilities allow you to work faster, work more efficiently, and save money in the process.

To help you find the best power tools for your work—whether it's business, publishing, graphics, online access, or all of the above—we tested scores of utilities, all highly recommended by *Macworld* experts, to come up with 24 most likely to ease your workload. They range widely in price, but most are inexpensive (usually less than \$100). Most occupy little space on your hard drive and don't require much in terms of RAM. Most are straightforward and easy to use—in some cases, installation is the last time you'll deal with them. Virtually all are available in stores, catalogs, or online shareware libraries. What we like best about all of them is that they provide power and convenience well in excess of their modest proportions.

Working on a Mac without a well-chosen set of utilities is a little like using a power tool with the electricity turned off—you probably can do it, but why would you want to try? Tell your bean-counters that investing in the right utilities can raise productivity and reduce costs—and use these tools to prove it to them.

BY ROBERT C. ECKHARDT





Universal Utilities

PART I: THE WAY YOU WORK

Some utilities make sense to have, no matter how you use your Mac. Some of them change the way your Mac works—

and the way you work with your Mac.

Conflict Catcher System 7.5 has been known to install over 100 start-up files (extensions and control panels) in a standard installation. Add a few favorite third-party start-up files and hold onto your hat. Crashes, erratic behavior, and other abnormalities are a distinct (and distinctly unpleasant) possibility—unless you use Conflict Catcher 3, the answer to an extension addict's (certainly *this* addict's) prayers. Conflict Catcher allows you to turn start-up files on and off, change the order in which they load, view information about each one, and organize your start-up files into sets for different tasks. At start-up, Conflict Catch-

er tells you which set is loading, identifies your start-up icons by name, and allows you to interrupt the start-up process if you want to install a different set. It also automatically turns off files that bomb during start-up and can help you determine which stealth start-up file is causing a blip on your radar screen.

Now Utilities Two Now Utilities modules are another addition of mine. The NowMenus module creates standard or pop-up menus containing recently opened or often-used documents, applications, even entire menu bars. It allows you to add or change the key commands (and see your changes displayed) in the menus of most applications, and its "sticky" menus open automatically when the pointer passes over them. The Super Boomerang module adds lists of all recently accessed files and folders to the Apple menu and to the Open commands of your applications. Conveniently, it also automatically highlights the last opened (instead of the first listed) file or folder in the Open and Save dialog boxes. Together these modules add a major collection of minor time-savers that really add up.

DragStrip Launchpads are very popular these days, and for my money the best choice is DragStrip 2. Among its many virtues are multiple palettes (including a current-applications palette for quick switching among programs), large and small palette icons, status bars that display either file or application names (see "Text on the Side"), drag-and-drop icon installation (and editing), pop-up menus (listing folders, documents, and so on), and keyboard navigation. DragStrip's defects—icons that don't

UNIVERSALLY USEFUL

PART I: THE WAY YOU WORK

★★★★/9.4 **Conflict Catcher 3.0.2** Pretty near perfect, and pretty near essential, start-up file manager. **Company:** Casady & Greene (408/484-9228). **List price:** \$99.95.

★★★★/7.6 **Now Utilities 5.0.2** Diverse utilities collection with especially useful custom menu module. **Company:** Now Software (503/274-2899). **List price:** \$89.95.

★★★★/8.1 **DragStrip 2.0** Feature-packed file launcher well worth the premium price. **Company:** Natural Intelligence (617/876-7680). **List price:** \$59.95.

PART II: UNDER THE HOOD

★★★★/8.7 **Adobe Type Manager 3.9** Accurately renders PostScript fonts at all sizes on screen and on any printer. **Company:** Adobe Systems (415/961-4400). **List price:** \$39.95.

★★★★/8.9 **SuperATM 3.9** ATM's PostScript font rendering plus intelligent substitution for missing fonts. **Company:** Adobe Systems (415/961-4400). **List price:** \$69.

★★★★/8.6 **RAM Doubler 1.6** Fools your Mac into thinking it has twice the RAM it actually does. **Company:** Connectix (415/571-5100). **List price:** \$99.

★★★★/7.8 **DiskExpress II 2.20** Intelligently defragments hard drives for optimum drive performance. **Company:** Alsoft (713/353-4090). **List price:** \$89.95 (or as part of Alsoft Power Utilities, \$139).

★★★★/7.3 **AliasZoo 2.0.5** Locates and fixes orphaned aliases and deletes unneeded ones. **Company:** Blue Globe Software. **Shareware fee:** \$15.

★★★★/7.1 **OptiMem RAM Charger 2.1.2** Increases RAM available for applications by allocating it more efficiently. **Company:** Jump Development Group (412/681-2692). **List price:** \$129.



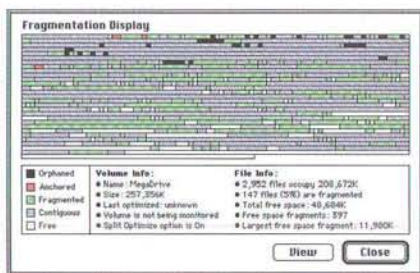
Text on the Side My favorite DragStrip 2 feature is palette titles and status bars that run vertically so you can actually read what they say.

automatically shift position when you resize a palette and a notably poor manual—are relatively minor.

PART II: UNDER THE HOOD

Other universally useful utilities tinker under the hood, subtly (or not so subtly) improving your Mac's performance. Most can be forgotten once you've installed them; a few require your attention from time to time.

ATM Adobe Type Manager (ATM) radically improves the rendering of PostScript fonts at all sizes, both on screen and on any printer; it's essential for just about anyone. In System 7.5, Apple's QuickDraw GX Installer automatically installs ATM. The problem is, most Mac owners don't need memory-hungry QuickDraw GX. If you don't want to jump through hoops to install ATM without QuickDraw GX, most Adobe products include (and usually automatically install) ATM.



How Bad Is It, Doctor? DiskExpress II graphically displays how files are stored on your hard drive and how badly they're fragmented.

You can also order an inexpensive ATM-only disk (\$9.95) direct from Adobe; shrink-wrapped copies of ATM and SuperATM—which can substitute fonts more or less intelligently in documents that use fonts you don't have—cost more (\$39.95 and \$69, respectively) but include small libraries of Adobe typefaces.

RAM Doubler Real RAM can't be beat, but when you can't afford as much as you want (and who can?), RAM Doubler is the answer. Once you've installed this utility, your Mac thinks it has twice as much RAM as it actually does. Amazingly, there's very little performance penalty for this clever trick. Although I have occasionally heard of conflicts with other programs, I have yet to encounter one myself. The one real drawback to RAM Doubler is that it helps only those who run a number of programs simultaneously; if you have one memory-hogging application,

you'll have to buy the real thing.

DiskExpress II People don't talk much anymore about disk optimization (reuniting file fragments stored at random throughout a drive), but a defragmented hard drive is still a fast hard drive. I like DiskExpress II best for this task because of its graphic fragmentation display (see "How Bad Is It, Doctor?"), the smart way it stores optimized files according to how much I use them, and the care its programmers have taken to prevent accidental data loss. Even though it runs in background mode, I wait and manually launch DiskExpress just before long lunches or during periods of writer's block.

AliasZoo Regularly cleaning out your stable of aliases will help keep your Mac running smoothly, and sweeping up abandoned and irrelevant aliases is best accomplished with AliasZoo. It verifies all your aliases to ensure they're functioning properly and identifies those that aren't. Any alias, healthy or not, in AliasZoo's complete alias tally can be renamed, re-assigned to a new target file, or tossed into the Trash.

OptiMem RAM Charger Hard-core tinkerers who want to squeeze every drop of performance out of their Macs should consider OptiMem RAM Charger, an extension that radically changes the way RAM is allocated to applications. Instead of allowing a program to hoard a big chunk of RAM (the standard Mac method) regardless of what it actually needs, RAM Charger initially gives an application the smallest amount of RAM it can survive on and ladles out more RAM only if it's required. Because your applications use RAM more efficiently with RAM Charger, you can run many

more applications simultaneously. (With RAM Doubler installed as well, the number of programs you can run at once will impress even the most jaded multitasker.) Sadly, some programs don't take kindly to RAM Charger's manipulations; fortunately, you can turn RAM Charger off for these applications but still reap its benefits with all your other programs. RAM Charger works adequately with its standard factory settings and can automatically improve upon some of those settings by watching the way you work, but those with no technical know-how are best off avoiding it, since careful tweaking of its rather esoteric options is the best way to optimize RAM Charger's performance.



Online Utilities

Electronic communications are getting more complex every day. A few well-chosen online tools can reduce download costs and help organize incoming mail.

Claris E-mail The blessings of E-mail can quickly become a curse if you don't have a single, well-designed mail center. That's where Claris E-mailer

ONLINE HONORS

★★★/6.9 **Claris E-mailer 1.0v2** One-stop E-mail sending, receiving, and storing, plus a single all-encompassing address book. **Company:** Claris (408/987-7000). **List price:** \$89.

★★★/6.7 **GrabNet 2.0** Bookmark manager for Netscape Navigator grabs Web graphics and text. **Company:** ForeFront Group (713/961-1101). **List price:** \$19.95.

★★★★/7.9 **StuffIt Deluxe 3.5** Mac, PC, and Internet file compression and decompression. **Company:** Aladdin Software (408/761-6200). **List price:** \$129.95.

comes in. EMailer knows how to exchange mail (using its own software) with America Online, CompuServe, eWorld, RadioMail, and the Internet. With a single command (or according to a predefined schedule) it can send and receive all your mail for all your accounts, automatically prioritizing it according to your preferences. It stores all your old mail in a single Filing Cabinet containing a user-defined scheme of folders. EMailer makes great use of the drag-and-drop function for almost everything, and best of all, it offers a single address book for everyone you know, so you never need to think about *how* to contact someone. EMailer is far from perfect—it can't pick up my CE Software QuickMail messages, for example, and handles PPP Internet connections poorly—but even if you get mail on only one service, life online with EMailer is far more efficient than life without it.

GrabNet If you're a serious (or merely half-serious) Web surfer, you know that the one place Netscape Navigator 1.X falls down is in managing large collections of bookmarks (or URLs, the online addresses for Web sites; version 2.0, scheduled for release about the time you read this, addresses this problem). GrabNet fills this gap admirably with its hierarchical list of bookmarks, either working on its own or installing a GrabNet menu in Navigator (see "Caught in the Web"). In Navigator, send the bookmark for the current Web page to GrabNet with a GrabNet menu command. Send a Web graphic, a portion of a Web page, a piece of Web text (all with bookmarks attached), or an embedded refer-



Caught in the Web With GrabNet's Finder-like, customizable hierarchy of folders, you can easily organize hundreds of bookmarks. You can also view graphics or text attached to the selected bookmark.

BUSINESS BASICS

★★★★/8.6 **Desktop Dialer 1.4.2** Dials phone numbers appearing in any document. **Company:** Sophisticated Circuits (206/485-7979). **List price:** \$75.

★★★★/9.3 **AreaCodeFinder 4.0** Identifies the location (as well as the time zone) of an area code and vice versa. **Company:** John Calande. **Shareware fee:** \$15.

★★★★/7.5 **Typelt4Me 4.5.1** Automatically expands user-defined abbreviations in any application. **Company:** Riccardo Ettore. **Shareware fee:** \$30.

★★★★/7.6 **MacLinkPlus/Translators Pro 8.06ia** Excellent PC-to-Mac (or reverse) conversions for word processor, spreadsheet, or database documents. **Company:** DataViz (203/268-0030). **List price:** \$149.

★★★★/8.3 **PopupFolder 2.0.1** Improves Finder navigation via ubiquitous pop-up menus. **Company:** Inline Software (617/938-8088). **List price:** \$79.

★★★★/7.3 **Calc+ 2.0** Simple calculator with a resizable, scrollable, editable, printable tape. **Company:** Abbott Systems (914/747-4201). **List price:** \$29.

ence to another Web site to GrabNet with little more than a simple point and click. In GrabNet, view the graphics or text attached to any bookmark in the GrabNet list, or double-click on a bookmark to switch to Navigator and go directly to that Web site. GrabNet makes Web navigation with Navigator significantly easier. My only gripe is the lack of a manual; learning GrabNet through its Apple Guide is painfully tedious.

StuffIt Deluxe In the Mac online universe, files are "stuffed" (compressed) for faster transfer. Although it's possible to rely solely on self-extracting files and shareware unstuffers, serious telecommunicators should treat themselves to a copy of StuffIt Deluxe. In addition to near-effortless stuffing, unstuffing, and archive management, StuffIt Deluxe handles a broad spectrum of other Macintosh (Bin-Hex and MacBinary, for example), PC (Arc, Zip), and Internet (uuencoding) transfer formats. If your target audience includes PC owners, stuff your files as usual and direct PC users to StuffIt Expander for Windows (freeware) for unstuffing. Or, since virtually any PC decompression utility can unzip a compressed file, you can create zipped versions of your files (sadly, StuffIt can only unzip files) with easy-to-use ZipIt (Thomas Brown, \$15).



Business Utilities

In business, we all deal with machines other than our Macs, from phones to other people's PCs. Here are some high-efficiency utilities for easy dialing, file conversion, and other business necessities.

Desktop Dialer Recently, I added Desktop Dialer's cigarette-pack-size box to one end of my keyboard's ADB cable, routed my phone line through the box, and told Dialer's software my local area code. Now I need only click on a number (in my Now Contact database—or in any of the dozen or so other programs that work directly with Dialer), or highlight a number and press a key command, and Dialer dials the phone for me. Incredible. Not incredible is Dialer's 20-number memory-dial desk accessory, which is less convenient than the memory-dial in my



Drive-Thru Menus PopupFolder adds instant contents menus to disk and folder icons in the Finder (as shown here) and in Open and Save dialog boxes.

phone. But my greatest disappointment is that Dialer can read numbers only, and not easy-to-remember, hard-to-dial numbers like 1-800/SOS-APPLE.

AreaCodeFinder Other phone hassles—finding the area code when you know only the city, determining the geographic location of an unfamiliar area code, and figuring out whether it is too late (or too early) to call—have been solved by this utility. Enter the name of the city and AreaCodeFinder tells you the area code. Enter an area code and you get the state and cities that use it. There is also a map of North America and its time zones, which displays the current time in each zone and highlights the location of the most recently searched area code. Conveniently, AreaCodeFinder stores all its information in a separate, easy-to-replace data file, which is frequently revised (since new area codes are popping up like mushrooms after a rain) and available online.

TypeIt4Me If your macro needs are modest, consider TypeIt4Me. Easy to use and reliable, TypeIt4Me's forte is automatic text expansion. Once you teach it your shorthand, TypeIt4Me automatically replaces text as you type. You can also create abbreviations for the current date and time and teach TypeIt4Me to correct your most common typos. Don't tell Microsoft, but TypeIt4Me is an inexpensive way to give Word 5.1 a good facsimile of Word 6's AutoCorrect function.

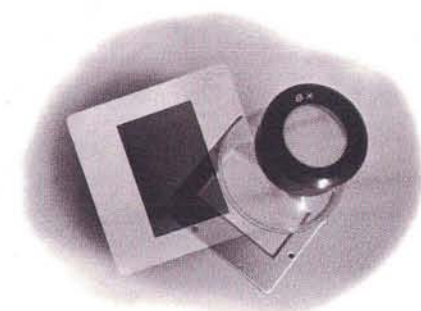
MacLinkPlus/Translators Pro If you regularly exchange word processor, spreadsheet, or database documents with PC users, there's no better way to convert those files than with MacLinkPlus/Translators Pro. Translators Pro makes opening a PC file as easy as double-clicking on it, opening it with your application's Open command, or dragging and dropping it (or a batch of files) on Translators Pro's Document Converter applet. Translators Pro's word processor conversions retain embedded graphics and original format-

ting to a remarkable degree, and its new HTML translator gives you Web pages much as they appear in Netscape Navigator or Spry Mosaic (with embedded Web addresses conveniently appended as footnotes). Translators Pro includes Apple's Macintosh PC Exchange, which allows you to use DOS disks in your Mac's floppy disk drive. (Software Architects' DOS Mounter 95 does the same for any removable DOS media, including SyQuest cartridges and rewritable optical disks.) Also included is DataViz FileView, which (like Abbott Systems' very skillful CanOpener) can extract the text from virtually any Mac, DOS, or Windows document that stumps the translators.

PopupFolder Even with neatly nested folders, digging into or out of them to file or retrieve documents is still a troublesome task. You can greatly streamline folder navigation with PopupFolder, which adds hierarchical menus both to window title bars and to folder and disk icons (see "Drive-Thru Menus"). You can traverse these pop-up menus simply to get to a file, or you can drag a file to move it or copy it, drop it on an application, or install its alias. For instant recall, PopupFolder also allows you to assign keyboard shortcuts—usable in the Finder and Open and Save dialog boxes—to files, folders, and applications.

Calc+ If you're looking for an audit trail, Calc+ is the way to go. This calculator has a resizable, scrolling "tape" with color-coded totals and a one-number memory (hey, that's one more than Apple's Calculator). You can resize the scrolling tape, select the appropriate font and size, insert line-by-line comments, edit previous entries (Calc+ automati-

cally recalculates any affected sums), and save or print your tape. Desktop publishers, take note: Calc+ also does instant conversions between inches, centimeters, picas, and ciceros.



Graphics Utilities

If it seems like your graphics files are managing you, rather than the other way around, here are some great preview and conversion tools.

DeBabelizer DeBabelizer is a god-send for anyone who needs to work with lots of scans, downloaded images, and the like—but it is devilishly difficult for most mortals to use. DeBabelizer can convert a file to one of 70 graphics formats and can deal with hundreds of files at a time. In the process, it can scale or crop graphics, reduce their color depth, adjust the color palette, and more, using a variety of options. Although it has a clunky interface and poor manual, DeBabelizer does provide excellent color controls, it manipulates QuickTime movies, and now it supports formats used by Web-page designers.

GRAPHICS GOLD

★★★★7.6 **DeBabelizer 1.6.5** Endlessly talented and exasperating batch processor for bitmapped graphics. **Company:** Equilibrium Technologies (415/332-4343). **List price:** \$399.

★★★★7.2 **Transverter Pro 3.0.1** Batch-process PostScript files or preview them to catch mistakes before printing. **Company:** TechPool Software (216/291-1922). **List price:** \$395.

★★★★7.3 **Adobe Fetch 1.2** Catalog graphics, text, and more for easy organization and retrieval. **Company:** Adobe Systems (415/961-4400). **List price:** \$149.

And Honorable Mention Goes to . . .

WHenever I write one of these cast-of-thousands articles, there are always a number of great performances that end up, for one reason or another, on the cutting-room floor. Here are a few of my favorites.

Suitcase Although it's the best font manager available, Suitcase 2 (Symantec, 541/984-2490) is so old that my manual is yellow with age. A completely redesigned and rewritten Suitcase 3 should be available by the time you read this; if you have a large font collection, be sure to check out this utility.

Tracer If you need to convert bitmaps to Béziers, Tracer (ScanVec, 508/694-9488) can run circles around Adobe Streamline. Unfortunately, Tracer also has a few rough edges: it's outlandishly expensive, it uses hardware-key copy protection, and it sometimes performs erratically.

Poser If drawing lifelike figures has you stumped, let Poser (Fractal Design, 408/688-8800) give you a hand. You can twist and turn its wide variety of double-jointed



On Your Toes You can view a Poser figure from any position, change the perspective, adjust the lighting, and select from a variety of surface styles and textures.

body types to create figures in any position (there are many predefined poses, too). Only detailed facial features and hand positions and loose-fitting clothing are shortchanged in this easy-to-use program (see "On Your Toes").

OneClick A macro program in disguise, OneClick (Westcode Software, 619/487-9200) adds button bars to the Finder and any application (see "Who's Got the But-



Who's Got the Button? In addition to launching programs and macros, the buttons on OneClick palettes can open other palettes, pop-up menus, and specialty items such as a monthly calendar.

ton?"). Define buttons by dragging and dropping applications or folders, selecting from a library of predefined buttons, defining tasks by example, or programming buttons using AppleScript or OneClick's EasyScript.

theFONDler Although it makes little effort to disguise the guts of font anatomy, theFONDler (Rascal Software, 805/255-6823) can locate corrupt font files and dozens of other problems that mess up print jobs, as well as eliminate font-ID conflicts once and for all. I just wish Rascal would give it a different name. (For more details, see *Reviews*, in this issue.)

EMMpathy EMMpathy (Bill Steinberg, freeware) can locate and correct corrupted data in a 500-series PowerBook battery's Energy Monitoring Module (EMM), bringing apparently dead batteries back to life.

SignatureQuote For communications programs that lack these essential functions, SignatureQuote (Semicolon Software, shareware fee \$10) can stamp your E-mail with one of two ready-made "signatures" and "quote" incoming text (using the angle brackets standard on the Internet) for a reply.

MultiClip Pro Unlike Apple's Clipboard, MultiClip Pro (Olduvai, 305/670-1112) can store as many items as you care to copy into it, and paste them back in the same or reverse order—or you can select and paste a specific item. Conveniently, you can easily operate MultiClip from the keyboard; unfortunately, the program eats up a whole megabyte of RAM.

Speed Doubler If you own a Power Mac, Speed Doubler (Connectix, 415/571-5100) replaces Apple's 680X0 emulator and runs nonnative applications noticeably faster. Like CopyDoubler (in Symantec's Norton Disk-Doubler Pro), it also smartens up the Finder's less-than-intelligent file copying.

Transverter Pro If Béziers are your métier (or your bête noire), you need Transverter Pro. Its major skill is converting raw PostScript (such as a printed-to-disk page-layout file), EPS, or Acrobat (PDF) files—or a piece of a file, or a batch of files—into TIFF, PICT, JPEG, EPS, or Adobe Illustrator format. It can also add screen previews to EPS files that lack them, convert multipage PostScript files into single-page placeable files, and preview PostScript files (if you're conversant in PostScript) to help you eliminate errors before they cost money. Conversion options are limited (compared with DeBabelizer's), manuals need major work, and the conversions aren't always perfect, but in comparison with Photoshop's standard EPS-to-bitmap conversions, Transverter Pro easily came out on top.

Adobe Fetch Theoretically, I could organize all my multimedia files in one huge hierarchy of nested folders (if my hard drive were big enough) and use Photoshop's tiny thumbnail icons to distinguish different images. Practically speaking, I prefer to keep my files where they are, have Adobe Fetch list them all in a master catalog, and maintain my sanity as well as my eyesight. Fetch easily catalogs files (no matter where they're stored) and adds file and folder names to each item's keyword list (you can assign additional keywords as well). I can view a catalog as big-enough-to-actually-see preview images (see "Order out of Chaos") or as faster-scrolling Finder-like lists. Unfortunately, Fetch doesn't allow me to drag and drop items into or between open catalogs. But because it can hand over the reference to a selected file (rather than the file itself), Fetch is an excellent companion to Adobe PageMaker or QuarkXPress.



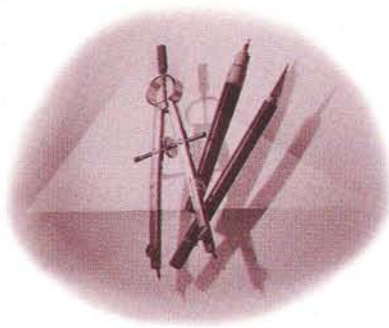
Order out of Chaos Although you can sort Fetch catalog items by name, file type, date added, and so on, you can't drag them into an arbitrary order (such as most to least often used).

PUBLISHING PARTNERS

★★★★/8.5 **TypeTamer 1.1.1** Every conceivable Font menu improvement in one well-designed program. **Company:** Impossible Software (714/470-4800). **List price:** \$59.95.

★★★★/7.2 **FontMonger 1.5.7** Easy font modifications, from redrawing characters to converting font formats. **Company:** Ares Software (415/578-9090). **List price:** \$149.95.

★★★★/7.4 **theTypeBook 4.02b** Creates font reference books from ready-to-print specimen pages. **Company:** Rascal Software (805/255-6823). **List price:** \$49.95.



Publishing Utilities

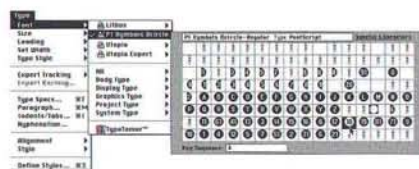
In publishing, managing lots of fonts and tons of typefaces is never easy. Take a look at these three timesaving organizers.

TypeTamer OK, here's the shameless truth: TypeTamer is the best font-menu manager I've ever seen. Somehow, it does everything and does it just right (see "Just My Type"). It automatically groups fonts by family, allows you to organize families into sets (all serif fonts together, for instance), and lets you scroll to a font simply by typing the first few letters of its name. Icons beside each font name indicate whether it's PostScript or TrueType; point to the icon to display either sample text or a complete character-set table from which you can locate any character.

FontMonger I'm not a big fan of messing around with typefaces experts have spent months perfecting, so some things FontMonger can do—converting TrueType fonts to PostScript (or vice versa) and tweaking character outlines—make me nervous. But for font-technology illiterates like me, FontMonger is an able typographic assistant. Use it to move a much-used character to a more conve-

nient key combination, for example, or to create typeset-quality fractions (such as ½ instead of 1/2). More suspect but sometimes unavoidable alterations, such as generating an oblique or small-caps font for a typeface that lacks one, are also easy to accomplish.

theTypeBook Making a typeface reference book is a lot easier with theTypeBook. Its one-typeface-to-a-page templates contain samples of character forms and alternate characters, examples of different point sizes, body copy at different leadings, and tables of characters per pica and capital-letter height. Other templates include full-page, large-point-size displays of a font's complete character set, keyboard layouts (great for pi or symbol



Just My Type For easy access, TypeTamer puts a separate list of the fonts in the current document near the top of the Font menu.

fonts), and catalogs that squeeze as many as 90 typeface samples on a page. You can customize the elements of any page, insert comments alongside any element, and add your business name and logo to the bottom of each page. theTypeBook's finished product is not only handy to have around but also looks quite professional to your clients. **m**

Contributing editor ROBERT C. ECKHARDT collects many kinds of small masterpieces, from utility programs to Mexican *retablos* and Zuni fetiches.

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Circle 47 on reader service card

Secrets

Comedy of Errors

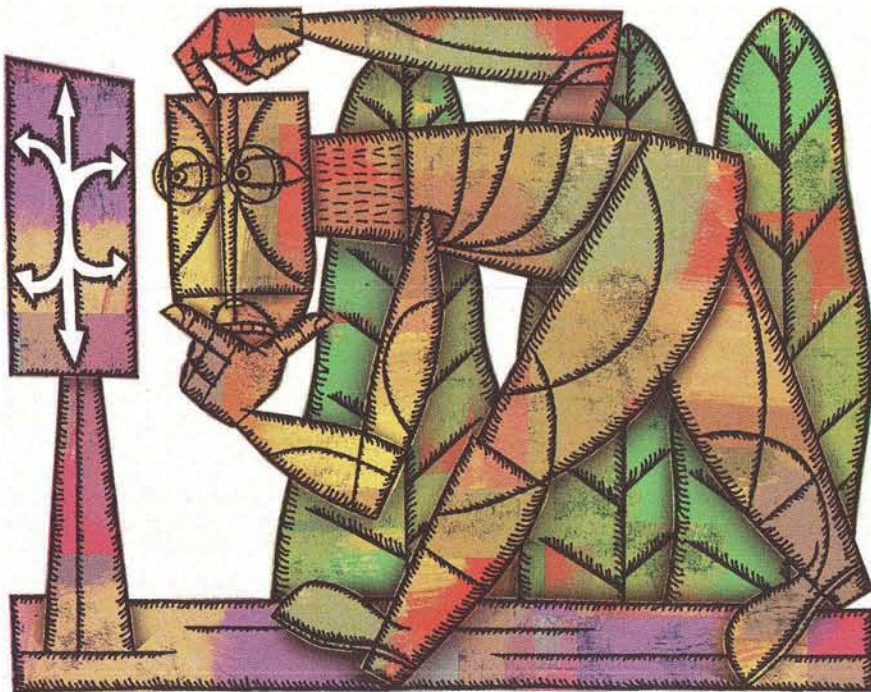
WHAT YOU REALLY LEARN FROM YOUR MAC'S MYSTERIOUS ERROR MESSAGES

by Joseph Schorr

The next time you find yourself staring at your Mac's frozen screen with a mysterious Type 1 error message flickering over your lost work, think about this: The Macintosh Operating System is capable of displaying more than 280 error messages. If you've only seen a handful of them, cheer up. Think of the hundreds you've managed to avoid.

OK, that's not terribly comforting. Maybe you've never had your day ruined by the sinister "Couldn't find 5 nybbles in 200 tries" (Error -66). Still, those morbid error messages you do see—and the crashes that accompany them—can make your blood run cold. But what if you really understood what all those messages and code numbers meant? Wouldn't that help you zero in on the root cause of your crashes? Wouldn't you be able to head off such tragedies in the future?

Don't kid yourself. Oh, it's true that every one of Apple's error codes does have a precise meaning that isolates a specific problem on your system. But frankly a lot of these cryptic error messages don't mean much to anyone but programmers. On the other hand, some error codes do contain clues that can help you track down a stubborn problem. Serious troubleshooters should know which codes to ignore and which provide genuine clues. Here are a few guidelines.



Don't Believe Everything You Read

It would be great if your Mac could tell you exactly what went on in the aftermath of a crash. In reality, the Mac's error codes aren't nearly that precise—or enlightening. For one thing, the error definitions themselves provide you with little information that you can actually use unless you're a programmer. Knowing that an "unimplemented core routine" (Error 12 or Error -4) caused your crash doesn't shed much light on why a program keeps crashing. Most error

codes contain technical information a programmer could use to pinpoint a glitch in code, but they don't give you much to work with.

The second—and even more frustrating—problem is that the error messages you get in a crash are often flat-out wrong; for example, the Mac might say you had an "illegal instruction" problem (Error 3) when in reality you simply used up all your RAM. Following the clues given by an error message could lead you down a blind alley.

WARNING! YOUR DAY HAS BEEN UNEXPECTEDLY RUINED

Here are a few other common error messages and the problems they point to:

"APPLICATION UNEXPECTEDLY QUIT" Applications quit without warning when they either run out of memory or encounter a conflict with an incompatible (usually out-of-date) system extension. A Type 1 error often means your program ran out of memory. The application tried to access a chunk of memory that didn't exist or needed more RAM than was available. You can remedy the problem by allocating more memory to the program, adding more RAM to the system, or simply restarting your

Mac so the RAM available is in contiguous chunks.

A Type 2 error is also related to memory use. The Mac tried to store a chunk of data in an address that couldn't hold it. A Type 3 error is called an illegal instruction error. It means the Mac tried to execute an instruction that isn't part of its standard vocabulary. The cause may be an out-of-date system extension or hard disk driver.

ERRORS 17 THROUGH 24 These errors indicate that the Mac tried to access one of the standard routines in the System file and couldn't find it. In all probability, that means you have a corrupted System file.

Try installing a new System file to replace the damaged one.

ERROR 25 Once again, you've run out of RAM.

ERRORS 26, 27, 30, 31 Apple says these errors tend to appear when your System file has gotten mangled. Replace it.

ERROR 28 This error is accompanied by the message "Stack ran into heap," but that's just another way of saying you ran out of memory.

TYPE 11 ERROR Don't look for specifics here. On a Power Mac, a Type 11 error can mean almost anything. It simply

refers to an error that occurred in reading native PowerPC code. Usually it means a bus error, an address error, or an illegal instruction.

ERROR -39 A -39 error is usually accompanied by the message "end of file" or "no additional data in the format." This error points in the general direction of a corrupted file. It means that the Mac started to process a file but couldn't finish reading it. If you encounter this message at start-up, it could mean that the Launcher has become corrupted. All you have to do is drag the Launcher control panel into the Trash and reinstall it.

The Bad F-line Fallacy

Here's a classic case of a fallacious error message: Power Macintosh users frequently get two error messages, one that says "FPU not installed" and another that says "bad F-line instruction." They get both of these closely related messages despite the fact that (1) Power Macs do have an FPU (floating-point support has been integrated right into the PowerPC

chip), and (2) they aren't using a program that requires an FPU anyway.

Why does this happen? One reason is that on 680X0 Macs, the CPU and the FPU send code back and forth using a special set of instructions (called F-line instructions because they always start with the letter *F*). Every so often, due to one glitch or another, your Mac may encounter a piece of code it wasn't sup-

posed to read—code that, coincidentally, starts with the letter *F*. The CPU interprets the code as an F-line instruction. Of course, your Mac can't carry out this instruction, because the Power Mac doesn't have a separate FPU chip waiting to receive the instruction, so you get a "No FPU installed" or "Bad F-line instruction" message. In reality, the cause was most likely an extension conflict or a program that needs to be upgraded, and has nothing to do with FPUs or F-lines.

When All Else Fails . . .

There are hundreds of error messages you may see on your Mac, but the most common are caused by only a handful of problems: a system extension conflict, a corrupted file, or lack of memory. If you're plagued by relentless Type 1, 3, or 11 errors, follow these troubleshooting procedures to wipe out the problem.

1. Turn off all extensions by restarting the Mac while holding down the shift key. If the error disappears, you know it's a corrupted or out-of-date extension or two conflicting extensions. Try to isolate and get rid of the conflicting extension. (You can use System 7.5's Extensions

Manager or a third-party utility such as Casady & Greene's Conflict Catcher 3 to turn extensions on and off selectively.)

2. Update the hard disk driver. Older SCSI disk drivers are known to conflict with SCSI Manager 4.3 and generate some of

the errors described above. You can update the driver by running Apple HD SC Setup version 7.3.5 or by using a third-party drive-formatting utility.


3. Zap the Mac's parameter RAM (PRAM) by restarting the Mac while holding down ⌘-option-P-R. (PRAM is the chunk of memory used to preserve various preferences and settings on your Mac.)

4. Perform a clean install of the system software, completely replacing the entire System Folder.

Decoding Error Codes

Does this mean all those error codes are worthless? No; in many cases the codes can point you in the general direction of a problem. In the example given earlier, the "unimplemented core routine" (Error 12) is a strong indicator that you're dealing with an honest-to-goodness software bug. It means the programmer placed a temporary break in the code for use in debugging but forgot to remove it before releasing the final code. If you can reproduce the error, it's a pretty clear indication that you need to contact the software vendor to report the bug and ask for a patch or an update. ■

Contributing editor JOSEPH SCHORR is co-author of *Macworld Mac and Power Mac Secrets*, third edition (IDG Books Worldwide, 1996).



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close to perfect
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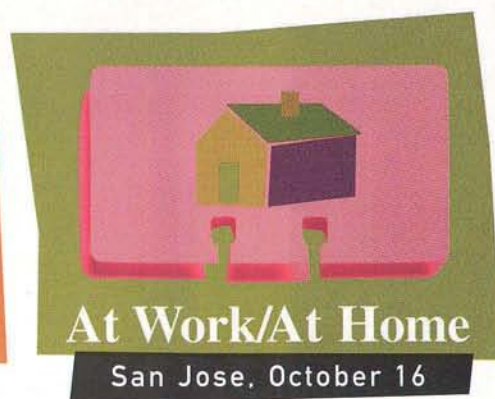
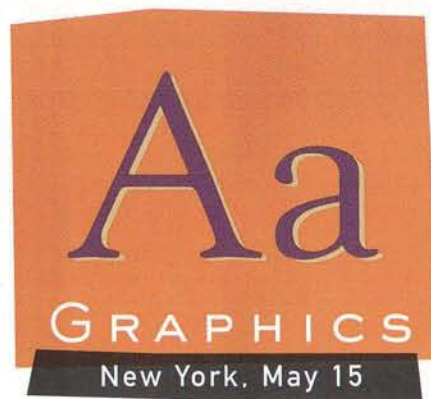
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Tips, Tricks, and Shortcuts

by Lon Poole

Although version 2.6 of America Online (AOL) for Macintosh doesn't have access to the Web-page tutorial that AOL for Windows offers (as noted in *Letters, Macworld*, January 1996), Macintosh users can

nevertheless publish Web pages on the Internet through AOL. First compose your Web pages in HTML format with a word processor or an HTML-editing program (such as Adobe PageMill), says Samuel Reichberg of New York (see "Build Your Own Home Page," November 1995). If you use a word processor, be sure to save each Web page as a plain text file. Next, test each page by opening it with the Open command in AOL's Web Browser while AOL is not connected. Then connect to AOL and upload the HTML files and supporting files (GIF files, AIFF sound files, and so forth) to your personal space on AOL's Web and FTP server. When you upload, specify text format for the HTML files and binary format for the supporting graphics and sound files. You have 2MB of space available for each of the five screen names your AOL account allows you.

To access your personal space, Bob Coon of Indianapolis suggests you type the keyword **My Place** and in the resulting window click the Go to My Place icon. You'll see AOL's FTP window displaying the contents of your personal space, much as the contents of a Mac disk appear in a Save dialog box. You upload files to your personal space by clicking the Upload icon at the bottom of the FTP window. (FTP stands for File Transfer Protocol, and you can think of it as the Internet's functional equivalent of a minimalist Finder.) There are other icons for managing your personal space—for renaming

and deleting files and creating directories, which are equivalent to folders. Upper-case and lowercase letters are not interchangeable in file and directory names on the Internet, cautions Steve Seaquist of Landover, Maryland. For simplicity, name your files and directories with lowercase letters.

The URL for a Web page in your personal space is <http://members.aol.com/screenname/filename>. In that URL, replace *screenname* with your actual AOL screen name in lowercase letters with all spaces removed, and *filename* with the name of

net port. When I select EtherTalk in the Network control panel, I can no longer access the LocalTalk LaserWriter. How can I get my Mac to access EtherTalk and LocalTalk simultaneously?

ROBERT FORSTOT
Saint Louis, Missouri

Apple's free LaserWriter Bridge 2.0 software may be just what you need. It allows you to have a primary network connection to Ethernet simultaneously with a secondary network connection to LocalTalk. After installing LaserWriter Bridge, set your primary network connection by selecting EtherTalk in the Network control panel. Then establish a secondary network connection by turning on the LaserWriter Bridge control panel. The software comes on the System 7.5 Update CD (800/769-2775, ext. 5794), and you can get it online as part of Network Software Installer 1.5.1 (AOL keyword, *applecomputer*; Web page, http://www.support.apple.com/wwwdocs/apple_sw_updates.html).

An Ethernet network can include any number of Macs with active LaserWriter Bridge software, but each Mac must be connected to a different LocalTalk network. In other words, each LocalTalk segment can have only one Mac with active LaserWriter Bridge software.

You control whether LaserWriter Bridge allows other Macs on the Ethernet network to access all printers connected to your LocalTalk network. LaserWriter Bridge can theoretically handle 32 printers, but to ensure adequate network performance, Apple recommends 8 or fewer. If you prefer, you can designate your LaserWriter Bridge as private.

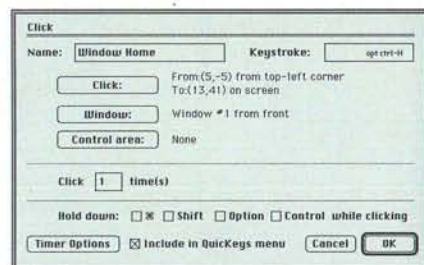
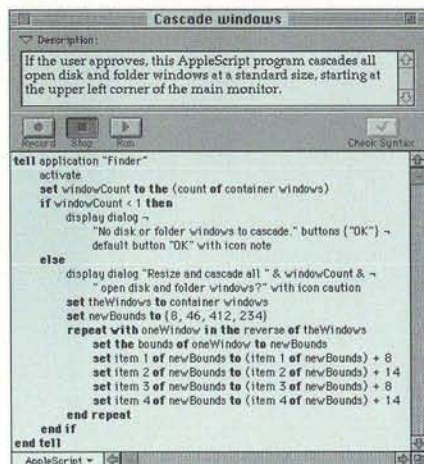
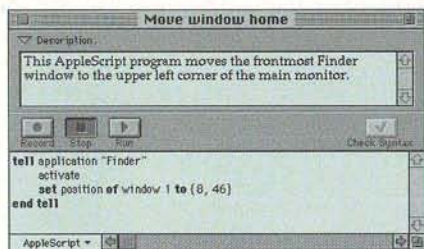
continues



the file. If you name your home page *index.html*, most Web browsers can link to it with the relatively simple URL <http://members.aol.com/screenname>.

LocalTalk Joins Ethernet

My Power Mac 7500 has a LocalTalk connection through the printer port to a LaserWriter Select 360, and an EtherTalk network connection through the Power Mac's built-in 10BaseT Ether-



Window Movers These two AppleScript programs (top and middle) and the QuickKeys shortcut (bottom) rearrange Finder windows. Make sure to save your script with the Kind option set to Application and the Never Show Startup Screen option turned on. For easy access you can put them in the Automated Tasks folder inside the Apple Menu Items folder. If you use Speech Recognition, put an alias of each script application in the Speakable Items folder. To create the QuickKeys shortcut, you define a Click shortcut whose Window option is set for the first window from the front and whose Click options are to click at coordinates $x = 5$, $y = -5$ relative to the top left corner of the window and drag the window to coordinates $x = 13$, $y = 41$ relative to the screen.

Other Macs on the same LocalTalk network segment as the LaserWriter Bridge can access only devices on that LocalTalk segment. If they need access to printers, file servers, or other network services on the Ethernet network (including printers connected through LocalTalk Bridge software to the Ethernet network), you can install Apple's \$100 LocalTalk

Bridge software where it establishes a two-way bridge between LocalTalk and Ethernet networks.

LaserWriter Bridge and LocalTalk Bridge also work with Token Ring as the primary network instead of Ethernet.

The Science of Window Arranging

Q I often copy a folder from a computer with a large screen area to another computer on the network with a small screen area. If the folder's window was positioned in the lower-right corner of the large screen, I sometimes can't see any part of the window when I open the folder on the small screen. I can't resize the window or work with its contents. The same problem occurs when I open some DOS disks that were last opened on a computer with a large screen. How can I force a folder or disk window to a viewable place?

DAVID MP
via the Internet

A The symptoms you describe surprise me because the Finder should position a window so that at least a part of its title bar is visible. It's then a simple matter to drag the window until you can see its zoom (grow) box, and resize the window to fit the screen. But even that chore becomes tedious if you have to do it repeatedly. You can use the Script Editor application that comes with System 7.5 to create a simple AppleScript program that moves the frontmost Finder window to the upper-left corner of the screen, or a somewhat more complicated script that makes all open disk and folder windows a standard size and cascades them from top to bottom. If you don't have System 7.5, which is the earliest version with AppleScript and a scriptable Finder, you can use a utility such as QuickKeys to create a macro that moves the frontmost window to the top left corner. "Window Movers" shows the two scripts and a QuickKeys macro, which are available from the Macworld Online software library.

An Accidental Easter Egg

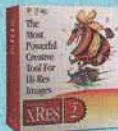
Q The text in my Labels menu has been replaced mysteriously with the seven letters *alanjef* (obviously two names), with

continues



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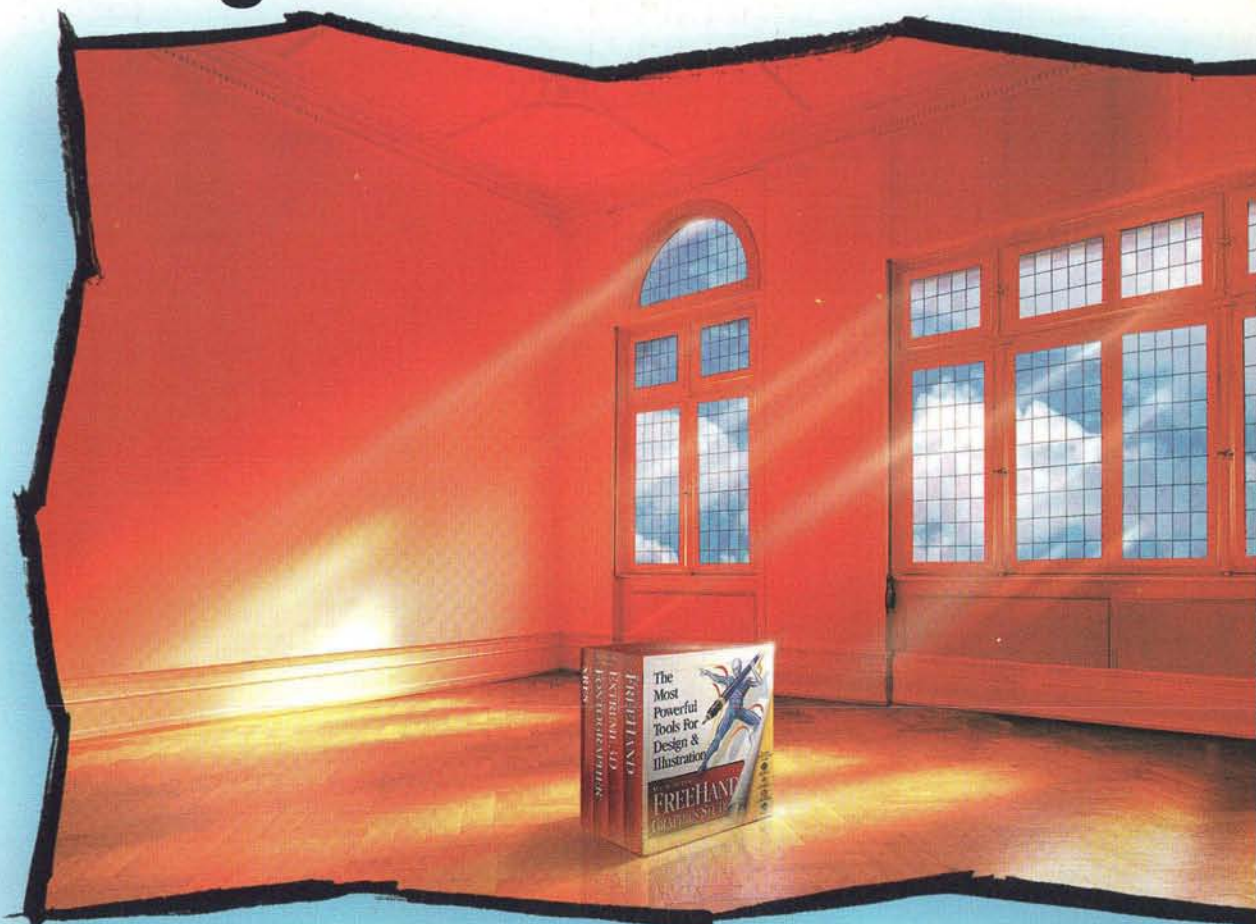

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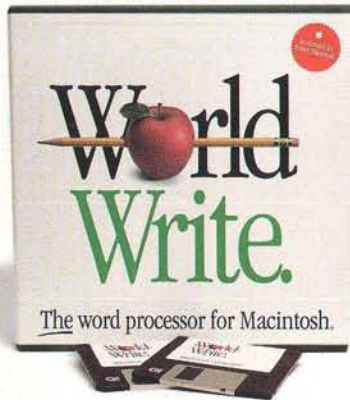
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QUICK TIPS

one letter next to each label color. Also, sometimes the Finder's Page Setup and Print Desktop commands are dimmed. What's going on?

DAVID KATZ

Edmonton, Alberta, Canada

A The Labels menu change is an Easter egg that appears when you delete all the text in the Labels control panel. To get rid of it, enter some text for each label and restart (the original labels are Essential, Hot, In Progress, Cool, Personal, Project 1, and Project 2). You can get instructions for uncovering lots of Easter eggs in "Apple Easter Eggs," compiled by Daniel Fanton and available through Macworld Online on the Internet (<http://www.macworld.com>) and on AOL (keyword *macworld*).

The Finder's Page Setup and Print Desktop commands are disabled when certain windows, such as About this Macintosh, the Clipboard, the Launcher, (or another control panel) are active. Click any icon or the desktop to enable those commands.

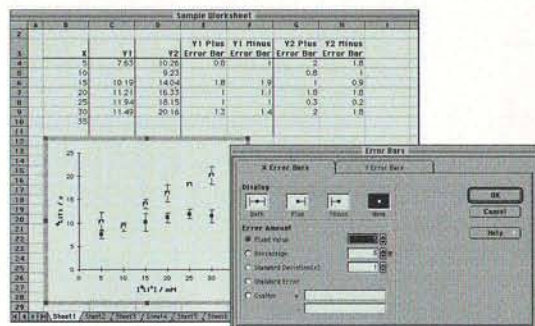
Server Log-in Shortcuts

TIP When logging on to an AppleShare server or a System 7 file-sharing server through the Chooser, you can press ⌘-R for Registered User or ⌘-G for Guest. Eliminating an extra trip to the mouse, this shortcut is especially nice for keyboard-oriented folks.

MARK ALTENBERG
Kensington, California

Instant Reprints (Well, Almost)

TIP Some documents take quite a while to spool for background printing, and that's on top of the time it takes to open the application and the document before you can begin printing. For example, I have Photoshop files that take several minutes to spool for printing on my Color StyleWriter. I like to share prints of those pictures with my friends, but to conserve ink I rarely print more than one or two copies at a time. I devised this procedure—using Apple's desktop printing software—for eliminating spooling delays.



Adding Error Bars In Excel 5.0's Error Bars dialog box you can add custom error bars to the data series currently selected in a chart. Near the top of that dialog box you select the direction in which you want error bars displayed—Plus, Minus, or Both. At the bottom of the dialog box you specify the amounts to use for each direction you selected (Plus, Minus, or Both). You can specify the error amounts for each direction as an array formula or as a range of cells; you can define a cell-range reference by typing it in or by dragging across the cells.

Before printing a file for the first time, select the desktop printer icon and choose Stop Print Queue from the Finder's Printing menu. Then print the file, causing a spool file (which the Finder calls a Desktop PrintMonitor document) to be created for the desktop printer. If you forget to stop the print queue before printing, immediately go to the Finder and stop the print queue or open the desktop printer icon and put the print request on hold. Next open the desktop printer icon and drag the spool file to any folder. When you're ready to make a print, hold down the option key and drag the spool file from that folder to the desktop printer icon. This makes a copy of the spool file for the desktop printer and leaves the original spool file untouched for future reprints. If necessary, use the Finder's Start Print Queue command to start up background printing. *Et voilà!* Reprints without spooling or opening a document and its application!

KOMRA MORIKO
Prescott Valley, Arizona

You can get the desktop printing software from Apple's online sites (listed above in "LocalTalk Joins Ethernet") as part of the LaserWriter 8.3 package or the Color StyleWriter 2400 package. The desktop printing software works with most Apple printer drivers, such as the StyleWriter II, StyleWriter 1200, LaserWriter 300, LaserWriter Select 310, and earlier versions of LaserWriter.—L.P.

The Truth about Suffix Removal

By itself Aladdin's free StuffIt Expander software can decompress or decode only four types of files—those whose names end with .sit, .cpt., .hqx, or .bin—not the long list of file types listed in January's *Quick Tips*. Doug Reider, of Roaring Spring, Pennsylvania, and other readers correctly state that you need to add Aladdin's \$30 shareware DropStuff with Expander Enhancer to handle the rest of the listed file types—those whose names end with .zip, .zrc, .pkg, .gz, .z, or .uu. Both DropStuff and StuffIt Expander are included with StuffIt Deluxe, but neither one comes with StuffIt Lite.

Easy Error Bars

It turns out there's an easier method than the one presented in January's *Quick Tips* for adding different error bars to individual data points in an Excel 5.0 chart. According to Sally Swedine of Seattle, and other readers, you should lay out the data to be graphed in the usual manner, with the x -axis data in one worksheet column and the y -axis data in the adjoining columns. Use additional columns for the amounts that specify the lengths of the custom error bars. Create the chart, and then select one data series by clicking a data point on the chart (if the chart is not already selected for editing, click it and then click the data point). Choose Error Bars from the Insert menu to bring up the Error Bars dialog box and in it enter the cell range that specifies the custom error-bar amounts for the selected data series, as shown in "Adding Error Bars." Close the dialog box and then use the Error Bars command again on each remaining data series. ■

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Macs, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses.

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. He is the author of *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

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Tamis Nordling, Adobe Magazine 3/95

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Aileen Abernathy, MacUser 8/95

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Parcel Post—Internet-Style

by Cameron Crotty

The season to be jolly may be long past, but few bad memories linger like holiday postal memories. Finding just the right gift for Aunt Gladys was

nothing compared with the hours spent wrapping it in bubble-pack, nesting it in multiple boxes, and dumping in cups of packing popcorn, all so that the glass tchotchke you bought would arrive whole and not in shards.

Sending files by E-mail is faster than relying on snail mail, but your electronic messages can receive treatment every bit as rough as the caresses of the mail-delivery services. And if you don't package your files properly, they might arrive in tiny, mangled pieces.

So what happens to files sent via Internet E-mail, and how can you protect yours?

Why Encode?

To send Aunt Gladys's memento, you need enough padding to survive the crushing blows delivered by conveyor belts and other parcels. On the Internet, the crushing blows come from Internet mail servers, all of which process only text messages, and some of which deal harshly with overlong messages.

This isn't a problem if you're sending unformatted text files, but those mail serv-

ers make a quick hash of any other type of file. Known collectively as *binary* files, these include image files, sound files, applications, QuickTime movies, and formatted text documents. In order for binary files to survive, they must be *encoded* as ASCII text.

Feeding a binary file through an encoding program produces a text file that looks like a monkey has been slapping your keyboard, but contains all the information in the original file. You can attach the text file to an E-mail message, or you can copy the encoded

recommend purchasing StuffIt Deluxe from Aladdin Systems (408/761-6200, info@aladdinsys.com; \$129.95). Not only is the StuffIt compression protocol one of the most popular in the Mac community, but it handles just about any compression and encoding protocol you will find on the Net, including most of the weird Unix and PC-compatible stuff.

How to Encode and Send

There are three main ways to encode binary files for the Internet: BinHex, UUCode,

files such as sounds or images. But uuencoding completely ignores a file's resource fork.

Enter BinHex, an encoding scheme that preserves the Mac's dual-fork file structure. BinHex is the most popular encoding method used on Internet Macintosh archives—you can generally recognize a BinHex file by its suffix, .hqx. Most Internet archives are Unix-based, and an encoded file can be simply stored as a text file, regardless of the operating system it originated on.

While StuffIt Deluxe is my commercial recommendation, for shareware stalwarts who need to decode BinHex files I recommend StuffIt Expander; Compact Pro from Cyclos and HQXer are also solid utilities for encoding and decoding BinHex files. Note: Do not use BinHex 5.0—it is not simply an upgrade of BinHex but uses a different encoding algorithm, making your files unreadable by other BinHex-decoding software, and it is unreliable.

UUCode UUCode was originally developed for Unix users to trade binary files using ASCII transport mechanisms. It's still in use in Usenet newsgroups, where you can download uuencoded image and sound files. You'll recognize such files from their suffix, .uu. Jeff Strobel's shareware UULite is a top-flight utility.

For a protocol, UUCode is pretty rude—it generally ig-



text and paste it directly into your E-mail. Since the file is now unformatted ASCII text, you can send it through any mail server, and once the file arrives, the recipient can use software to *decode* the text, reconstructing the original file.

There are a number of quality shareware tools for encoding and decoding binary files, and I'll talk about them as I describe specific protocols. But if you spend a lot of time sending and receiving files over the Internet, I highly

and MIME. Of these, UUCode is the oldest and MIME has the most future promise, but BinHex is a protocol that every Mac Net surfer should know.

BinHex If the Macintosh hadn't come along, we'd probably all still be sending each other UUCode (uuencoded) files. But the Mac OS has a two-pronged file structure—that is, every Mac file has a data fork and a resource fork. Generally, uuencoding isn't a problem when transferring data

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NETSMART

nores file types and headers—but it has widespread acceptance on the Net (mostly by the Unix crowd). Just remember: UUCode does not recognize the Mac's dual-fork file structure.

MIME MIME stands for Multipurpose Internet Mail Extensions, and it's a different approach. MIME is an attempt to build a standard to encode and transmit, then identify and decode, non-ASCII data. MIME messages are encoded text, but they also contain detailed information so that, ideally, your recipient's E-mail program can read the message, identify and decode the encoded parts, and display the entire thing. For example, you could use multiple font sizes, bold, italics, some in-line graphics, and a sound clip.

Unfortunately, not many E-mail programs specifically support MIME; three that do are Eudora Pro from Qualcomm (619/587-1121, *quest-rep@qualcomm.com*; \$89), the E-mail client in InterCon's TCP/Connect II (703/709-5500, *sales@intercon.com*; dial-up-only version \$195), and Claris EMailer (408/727-8227; \$89). If you want to try manually sending MIME messages, Mpack (Macintosh version by Chris Newman) encodes and decodes MIME parts for you, and can also decode

BinHex and uuencoded files.

Online Services If both you and Aunt Gladys subscribe to the same online service, then you're in luck. America Online, CompuServe, and Prodigy all support sending binary enclosures to other service members. You will still want to compress your attachments to reduce transfer times, but don't bother encoding anything.

America Online lets you send attached files over the Internet, and if you receive a file attachment that's been uuencoded, BinHexed, or compressed with StuffIt or Compact Pro, AOL's software automatically unpacks it. CompuServe and Prodigy do not allow members to send or receive attached files from the Internet. If you want to send a file, you have to encode it, and then paste the encoded text into the body of an E-mail message.

Why Compress?

It's generally a good idea to compress files before you encode them, for the simple reason that transferring smaller files saves time and dollars. Compression is especially important when sending files over the Internet, as encoding a file usually increases its size. Also, compressing a file gives you the

Web Worthy

Access the MIME FAQ at <http://www.cis.ohio-state.edu/text/faq/usenet/mail/mime-faq/top.html> for more information.

Likewise, the FAQ for <http://www.cis.ohio-state.edu/hypertext/faq/usenet/macintosh/comm-faq/top.html> is loaded with lots of useful telecommunications information.

The WWW Viewer Test Page site, <http://www-dsdl.lnl.gov/documents/WWWtest.html>, offers several document types so you can confirm that your file viewers are properly installed. One test lets you send an E-mail message with MIME attachments.

And for more info on BinHex, visit <http://www.natural-innovations.com/boo/binhex.html>.

Circle 36 on reader service card

Shareware PICKS

This month's crop of Mac shareware tools will help you encode, compress, and send files via E-mail across the Internet.

Standing head and shoulders above other decoding and decompression utilities, Aladdin Systems' **Stuffit Expander** is fast, free, and can handle nearly anything except for MIME-encoded messages.

Those interested in more-focused utilities should try **HQXer**, a BinHex file encoder/decoder; **UULite**, a shareware UUCode utility; or **Mpack**, a tool for encoding and decoding MIME messages.

Encoding a file may protect it from the E-mail gorillas, but compressing it will protect you from excessive connect charges. **Compact Pro**, from Cyclos, can compress and expand files, encode and decode using BinHex, and create self-extracting archives.

Once your file is packaged up, you can send it with **Eudora Light**, a freeware version of Qualcomm's Eudora Pro E-mail client.

You can find these applications in the Macworld Online Software Library on America Online or on our Web site (<http://www.macworld.com>). They are in the Mentioned in Macworld section.

opportunity to protect it with a password, providing you with some level of security. Keep in mind that adding a password to a compressed archive is like locking your car doors in a parking lot: it will keep out frivolous malefactors, but a determined thief will figure out how to bust a window and grab your stereo.

If you choose to compress a file, either make sure that your recipient has the appropriate decompression software or create a self-extracting archive. A self-extracting archive (often identified by the suffix .sea) builds the decompression software into the compressed archive, so the file will automatically uncompress.

If the file is larger than 64K, an Internet mail server may *segment* your message and deliver it in two or more bite-size chunks. If you receive an encoded message in two chunks, simply use a text editor to paste the sections back together, and send the file through a decoder. If the file is corrupted in the

sending, you might want to ask whoever sent you the file to use an encoder to presegment the file and send it as multiple messages.

Getting your files from here to there over the Internet can be tricky, but with the proper tools and some experimentation, the JPEG file you E-mailed to Aunt Gladys might get there in better shape than that glass knickknack. **m**

Associate editor CAMERON CROTTY (cameron@www.macworld.com) covers telecommunications issues and the Internet, and never gets tired of watching his E-mail in-box light up.

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Media

Sounding Good

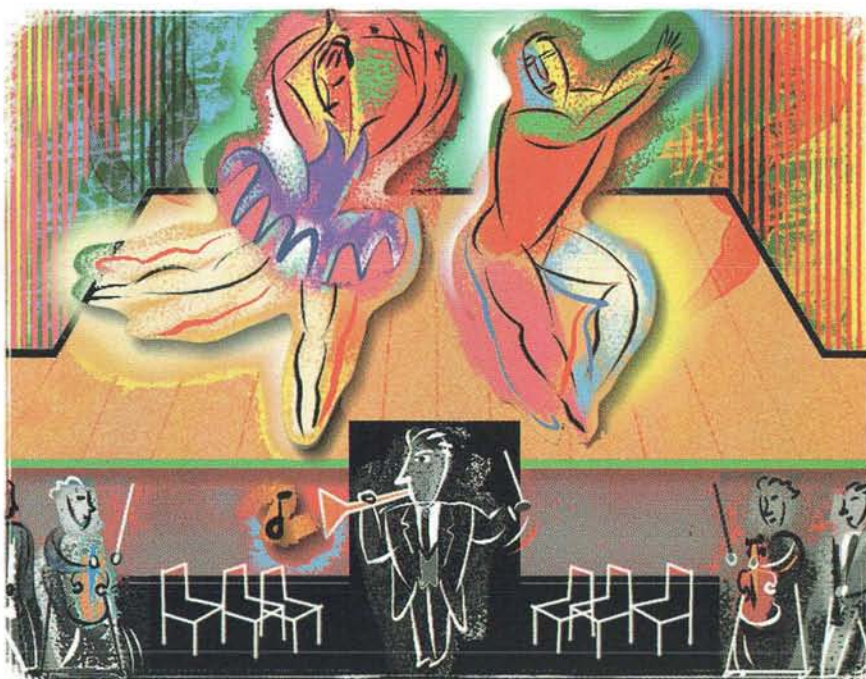
HOW TO MAKE SOUNDTRACKS SPARKLE

by Jim Heid

Which TV viewing experience would you prefer: a crystalline picture and staticky sound, or a snowy picture and high fidelity? Concertgoers—would you rather have an unobstructed view and muddy sound, or a tall hat in front of you and plenty of volume? As priceless as both senses are, we choose sound over sight when the sound conveys information.

So why is so much multimedia audio so lousy? One reason: QuickTime movie producers rarely have the luxury of delivering sound at CD-quality specs—a 44kHz sampling rate with 16 bits of resolution. Audio that rich has fairly high data-rate requirements, and accommodating it in a CD-ROM-based movie would reduce image quality. (See last month's *Media* column for an introduction to data-rate issues.) Also, some Macs and many Windows machines can't play back 44kHz, 16-bit sound. Disk space is another issue: CD-quality stereo sound uses 10MB per minute.

The World Wide Web is even more limiting. You can post 44kHz, 16-bit sounds on a Web site, but your listeners will need ISDN lines or better, lest downloads take forever. Audio-streaming technologies, like Progressive Networks' RealAudio, eliminate lengthy downloads, but compress and downsample audio to low-fidelity levels.



Let's look at what you can do during recording, editing, processing, and down-sampling to minimize this quality loss. (To hear examples, visit <http://www.mcn.org/beidsite/>.)

Record: Strive for the Highest Quality

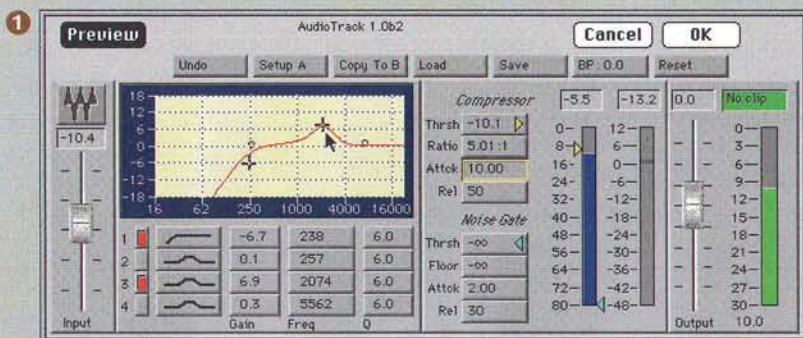
- Use the best microphone you can afford. Shure Brothers, Audio Technica, and AKG have excellent offerings for less than \$150 (sold through audio and music dealers). Even a \$39 public-address mike

from Radio Shack is better than the mike that comes with your Mac. A tie-clip mike works well for voice recording.

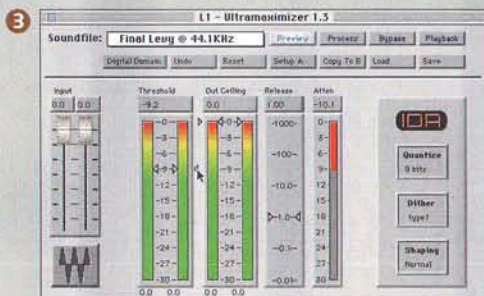
- For video work, use an external mike instead of the camcorder's built-in mike, which will pick up room noise.

- Use multiple mikes for multiple subjects. When videotaping a roundtable or a music group, dedicate a mike to each participant. Use a mixer (the \$429 Mackie Designs [206/487-4333] Microseries 1202-VLZ is hard to beat) to adjust volume levels and combine the signals into

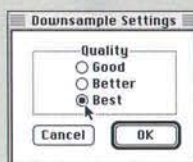
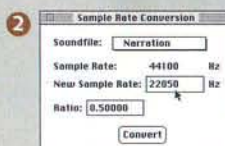
Steps to Better Soundtracks



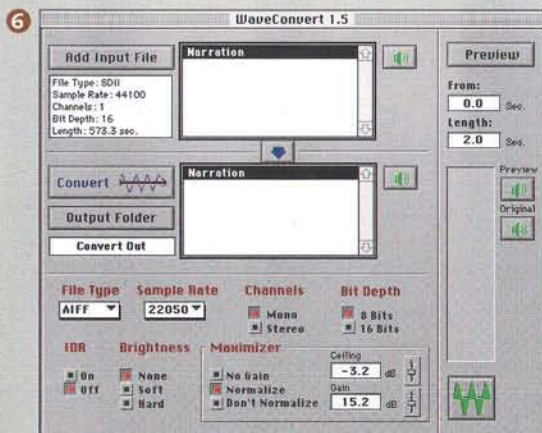
To optimize 44kHz, 16-bit audio for low-bandwidth delivery, begin by applying equalization, as shown here in Waves' AudioTrack. Cutting low frequencies removes undesirable background rumble, while boosting midrange frequencies adds some punch on low-end speakers.



optionally reduces its bit depth from 16 to 8. Always apply L1 as the final step in an audio processing job. (4) Before L1 processing, note the overall increase in loudness. Waves' L1-Ultramaximizer, a plug-in for Digidesign audio hardware, boosts a soundtrack's volume, shapes its waveform for optimal quality, and



After equalization, downsample the 44kHz file to the desired sampling rate (see the sidebar "A Field Guide to Formats") as shown here in Digidesign's Sound Designer II (top) and Adobe Premiere 4.2 (bottom).



Waves' WaveConvert utility packs downsampling, format conversion, and level optimization features into one dialog box. It's an ideal alternative to costlier utilities such as L1.

one track (for mono recording) or two (for stereo).

- Position mikes properly. If you're recording to the Mac's hard drive (rather than to a video recorder, for example), move the mike away from the hard drive and fan, which are noisy. Record in an acoustically *dry* room (one without echoes). To test a room's dryness, clap once and listen; if that clap reverberates, spread carpets and hang drapes on the walls to deaden echoes.

- Set the levels of recording software properly. Adjust the levels so that the on-screen volume meter reaches the upper end of its range during loud passages. To avoid distortion, however, make sure the meter's clipping indicator doesn't illuminate during loud peaks.

- Record at 44kHz, 16-bit, with no compression, using a Power Mac or 680X0 AV Mac. See "The Mac Recording Studio," *Macworld*, December 1995, and "Multimedia Secrets," August 1995, for details on audio settings and products.

Edit: Refine Your Material

- Delete awkward pauses and flubbed words in recorded narration or interviews. Do a cutaway to a different subject at edit points. Or do a brief cross-dissolve at the edit point; this prevents a jarring cut in which the speaker jumps from one position to another.

- To edit using Adobe Premiere or Avid VideoShop, use a sound-editing program—these mainstream video-editing packages don't have waveform-editing features. Macromedia's SoundEdit 16 works well; Digidesign's Sound Designer II is better still but requires a dedicated NuBus card. Macromedia's (formerly OSC's) Deck II works, too, but it's better suited to multitrack recording than to waveform editing. Regardless of the audio editor, you must go through an export/import routine to edit the soundtrack (see the screen shots "Editing Sound").

Process and Downsample: Finishing Up

- Perform edits at the 44kHz, 16-bit level. Unless the final product is for videotape or broadcast, you will eventually downsample the audio to a lower sampling rate and perhaps to 8-bit resolution. (If you do this with a video-editing package or a program such as SoundEdit 16, you'll get soundtracks containing an annoying hiss.)

Optimizing sound quality while downsampling and converting bit depths

requires you to perform a variety of steps in a specific order (see the sidebar "Steps to Better Soundtracks"). It also requires additional software, the best of which comes from Waves (423/588-9307, www.waves.com; note that Waves' products require a \$100 hardware dongle). The L1-Ultramaximizer (\$600 or \$800) boosts a soundtrack's volume and shapes its waveform to provide the best sound quality with the least amount of noise—the results are amazing.

The full bundle of Waves utilities sells for \$1650 to \$2300. The utilities work best as plug-ins for Digidesign Audiomedia II cards or Pro Tools III systems, but they also run on Power Macs with no additional hardware. Still, they may be overkill or at least overbudget for most multimedia producers. Great news: Waves has released two products that provide the most essential processing functions and don't require a dedicated audio card when used on a Power Mac. AudioTrack (\$300) provides equalization, compression, noise gating, and more; it works with Digidesign hardware as well as Adobe Premiere and programs that use the Premiere plug-in format.

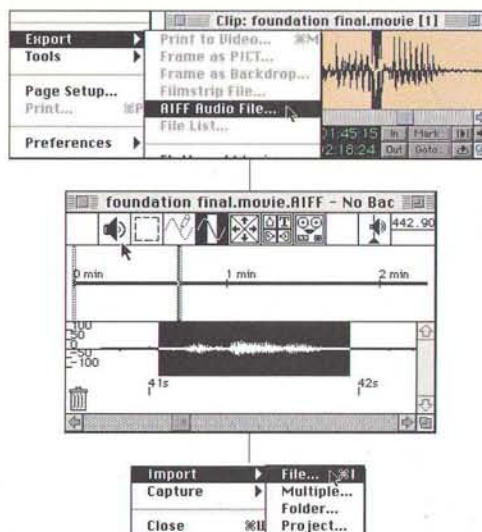
For downsampling, bit-depth conversion, and the level-maximizing marvels of Waves' L1-Ultramaximizer, get WaveConvert (\$300), which also lets you batch-convert audio files. Because it is a stand-alone program (not a plug-in), you must endure the export/import routine

Editing a QuickTime movie soundtrack in an audio program requires an export/import routine, like the one shown here in Adobe Premiere 4.2.

Top: In the Construction window, double-click on the movie clip's soundtrack to display its waveform (behind the menu). Then, choose AIFF Audio File from the File menu's Export submenu.

Middle: Import the AIFF file into an audio program and edit.

Bottom: Import the file back into Premiere and synchronize it with the video track.



described in "Editing Sound" to apply WaveConvert's talents to movie soundtracks. The results are worth the effort. (Version 2.0 of Macromedia's SoundEdit 16 provides improved downsampling features as well as a plug-in architecture that Waves has announced it will support.)

Sound Advice

Indeed, all the effort you put into optimizing audio pays off. CD-ROM consumers or Web surfers may forgive slow movie frame rates or low-resolution

graphics, but they'll remember the headache that bad sound gave them. You'd probably rather be remembered for something else. **m**

Next month: Optimizing graphics for CD-ROMs and the Web.

Contributing editor JIM HEID's interactive CD-ROM accompanies his *Macworld New Complete Mac Handbook*, fourth edition (IDG Books Worldwide, 1995). He also produces audio segments for Radio Macworld (<http://www.macworld.com/tccafe>).

A Field Guide to Formats

Here are some of the formats you'll need to know when producing audio files for CD-ROMs or Web sites.

CD-ROM

Sampling Rate For music, 22.05kHz (exactly half the CD-quality 44.1kHz rate) delivers reasonable fidelity. For voice, 11.025kHz may be acceptable. **Bit Depth** You get cleaner sound with 16-bit audio but 8-bit takes only half the space. Also, you should license Apple's Sound Manager 3.1, which is Power Mac native, for your title—versions before 3.0 don't support 16-bit sound.

Compression Sound Manager 3.1 and QuickTime 2.1 (not QuickTime for Windows, yet) support the Interactive Multimedia Association's IMA 4:1 compression scheme. IMA audio sounds good, but it may play poorly on slower Macs.

THE WEB

File Format By using QuickTime 2.1 with Apple's Movie Player 2.1 or Macromedia's SoundEdit 16 2.0, you can create the popular AU, or Sun audio, format files. Many sites encode AU audio as 8kHz, 16-bit files using the μ Law compression scheme. Movie Player

2.1 can export μ Law-format audio, although you must manually enter sampling rates lower than 11.025kHz in the Sound Export Options dialog box's Rate text box.

Audio utilities and QuickTime movie editors can also export and import Audio Interchange File Format (AIFF) files.

To play AU or AIFF files immediately after downloading them, a Web browser needs to launch an audio-helper application such as Norman Franke's freeware SoundApp.

Hearing audio while a file downloads requires a streaming technology such as Pro-

gressive Networks' RealAudio (<http://www.realaudio.com>). RealAudio 2.0 uses a higher sampling rate and provides significantly better quality than the previous version, but you need a 28.8-Kbps or faster connection.

New streaming technologies that rely on MPEG compression include StreamWorks from Xing Technology (<http://www.xingtech.com>) and MPEG/CDE from Kauai Media (<http://www.electriciti.com/kauai>).

Tip: Provide audio files in a compact, low-fidelity form and in a larger, high-fidelity form, and let Web site visitors choose.

Publishing Workshop

Cropping and Clipping

by David Blatner

Maybe you want to get rid of your ex-spouse. Or perhaps it's the background behind a gift that has to go. No, I'm not using *get rid of* in the mobster

sense—I mean “remove from a photograph.” In the real world, if you don't like something in a picture, you take out a pair of scissors and trim it off. In the electronic world, cropping and clipping is a little more complex. In this article I focus on cropping bit-mapped images.

Printing a cropped image can take 20 minutes or 2 minutes depending on what file format you use to save the file. In real life, each photograph or negative takes about the same amount of space. But in the electronic ether, every image bit takes up space on your hard drive, in RAM, and—when you print—in traffic over the network.

Cropping the Image Data

If you crop an image in Adobe Photoshop (or in a similar image-editing program) and then save the file with exactly the same name, the program throws away the cropped pixels—you can't go back and retrieve that image data (see “Cropping in Photoshop”). Because the new image contains fewer pixels, it takes up less space on your hard drive

and in RAM, and makes less traffic on the network.

Cropping and Page Layout

If you crop an image in a page-layout application, like Adobe PageMaker or QuarkXPress, the full image remains available to the application; it's simply not all visible on the page (this is also true for Adobe Illustrator and Macromedia FreeHand). That is, the application doesn't modify the original file on your disk, so you can always go back and change your mind (see “Page Layout and Cropping”).

However, the entire image (or a low-resolution preview of it) also remains inside your

page-layout file, taking up space. Let's say your design calls for three head shots, but all you have is a group photo.

Don't import the picture into your page, crop to select the first head, then import the photo again and crop for the



Resize the cropping rectangle by dragging a corner.



Selecting Crop from the Edit menu discards everything outside the selection.

To rotate and crop at the same time, hold down the option key when you drag. Move the cropping rectangle by holding down the ⌘ key and dragging a corner.

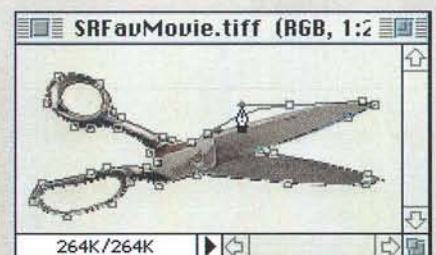
When you're ready to make the crop, click inside the rectangle. To cancel the crop, click outside the rectangle.

CROPPING IN PHOTOSHOP

To crop a scanned image in Photoshop, either use the crop tool, or make a rectangular selection with the marquee tool and select Crop from the Edit menu. In either case, Photoshop discards pixels; after you save the image, you can't get them back.

Photoshop Clipping Paths

PostScript clipping paths can be any shape, but the file can take a long time to print or, if the paths are very complex, may not print at all.



1. Use the pen tool to draw Bézier paths in Photoshop. One path can contain multiple, unconnected paths.

second, and so on. Instead, use Photoshop's cropping to isolate each head and import the three small files individually.

When you print your document, the page-layout program uses either of two methods to crop the image, depending on the image's file format. Either the program sends just the image data it needs to output the cropped image to your PostScript printer, or it sends the entire image to the printer along with instructions on how you want to crop it (called a *clipping path*).

TIFF versus EPS

When you crop a TIFF image in QuarkXPress or PageMaker, the program sends only the image data necessary to print the job. On the other hand, if you have a 10MB EPS (encapsulated PostScript) file and you crop it down to a small square, the program sends all 10MB to the printer when you print your page. That means using TIFFs can offer an incredible time savings *every time you print*.

Sometimes, however, you have to use an EPS—for duotones or clipping paths with XPress, for instance. In that case, first crop the image in Photoshop to get the smallest file possible. (By the way, you already know you shouldn't

use PICTs, right? They're not suitable for professional print publishing work.)

Time-Consuming Calculations

When the printer receives a clipping path, it performs the time-consuming task of carefully clipping out the unneeded parts of the image. Note that a clipping path is always a set of lines or curves, just like those from FreeHand or Illustrator—you can't have a clipping path with soft edges.

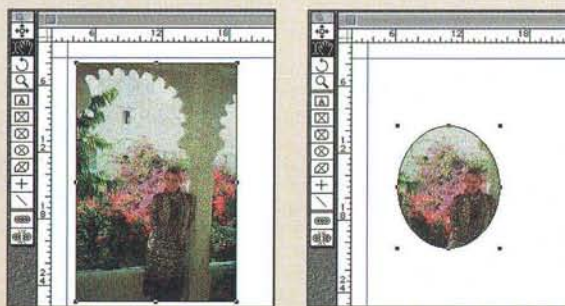
Let's say in real life you want to crop a photograph to a smaller rectangle with a pair of scissors. That's fast, right? Four snips and you're done. But if you want to pare it down to an oval, that might take you a little longer. PostScript printers have the same problem. The more curves or lines make up the clipping path, the longer the printer takes to perform the task.

Clipping Paths

You can make a nonrectangular crop in Photoshop, Illustrator, or FreeHand by drawing your own clipping path. In Illustrator you use the Mask feature; in FreeHand you use Paste Inside. In Photoshop you use the path tools, save the path with a name, then set it to be a clipping path (see "Photoshop Clipping Paths").

PAGE LAYOUT AND CROPPING

When you crop an image in a page-layout program, you can always recrop for a different effect. In PageMaker you can use the cropping tool or the Mask feature; in QuarkXPress you make the picture box smaller or change it to a different shape (like a polygon or an oval).



You now save the image as a TIFF or an EPS. However, at the time of this writing, only PageMaker recognizes TIFF images that have embedded clipping paths.

Clip or Crop

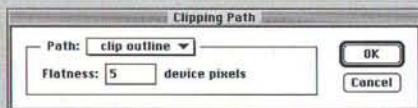
While many operations are easier on a computer than in the real world, it's clear that cropping and clipping are not among them. Seemingly minor differences in how you crop can be costly in minutes (which translate to dollars) spent on a project. I like using

TIFFs whenever possible, especially when I might be cropping in my page-layout application. My first choice is always to crop the image even before I get to PageMaker or QuarkXPress. **m**

DAVID BLATNER is the co-author of several books, including *Real World Photoshop*, *The QuarkXPress Book*, *Real World Scanning and Halftones*, and *QuarkXPress Tips & Tricks* (all Peachpit Press). He presents at seminars and conferences around the country and in Japan. You can E-mail him at david@moo.com.



2. Save the path in the Paths palette by double-clicking on the path.

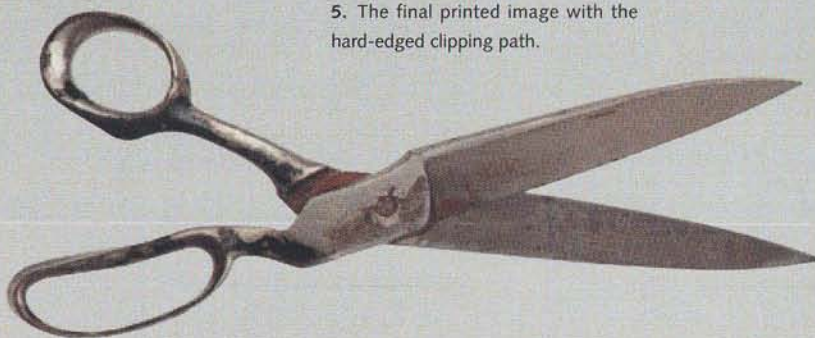


3. If you use PageMaker 6, you can save the image as a TIFF file. Choose Clipping Path in the Paths palette to turn the path into a clipping path.



4. If you save the image as EPS, set the path as a clipping path. Don't forget to set Flatness to 4 or 5.

5. The final printed image with the hard-edged clipping path.



Graphics Workshop

Creating and Using Customized Brushes in Painter

by Cathy Abes

ARTIST: At his studio, Portrayals, in Palo Alto, California, Jeremy Sutton uses Fractal Design Painter to create a wide variety of portraits, from celebrities to ordinary people. His clients have included

Apple, DreamWorks, and Virgin Atlantic Airlines. Armed with his PowerBook, Sutton frequently paints on-the-spot portraits—such as this one.

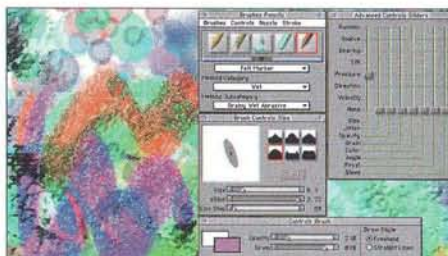
HOW IT WAS DONE: Sutton likes to push Painter's natural-media capabilities to the limit by customizing brushes to create particular effects. Here's a sampling of the ones he used in this portrait.

With a brush he called Viscous Mix, used mostly in the background areas, Sutton created a bubbly look, as if an oily base were rejecting a watery paint. Sutton saved each customized brush as a Brush Look (by choosing Brush Look Designer in the Brushes palette), which stores it in the Brush Looks library for future use.

Sutton used a brush he called Mountain Crumple, based on a paper texture called Mountains, to create the red and yellow spongy texture at the top of the hair. The brush used for the yellow-orange glowing highlight at the lower right he called Colored Distorto.

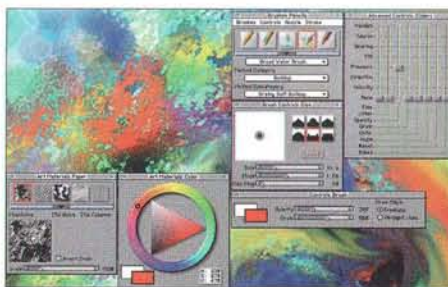
He created the hair texture with a standard large chalk and a paper texture, Rapunzel, from a library called Textures 2; he used Invert Grain to get just the wavy lines instead of the color between the lines. Moving the grain slider down to 12 applied the color only to the raised areas of the paper texture, accentuating the grain. Lowering the opacity to 50 percent gave him more control over the buildup of color. **m**

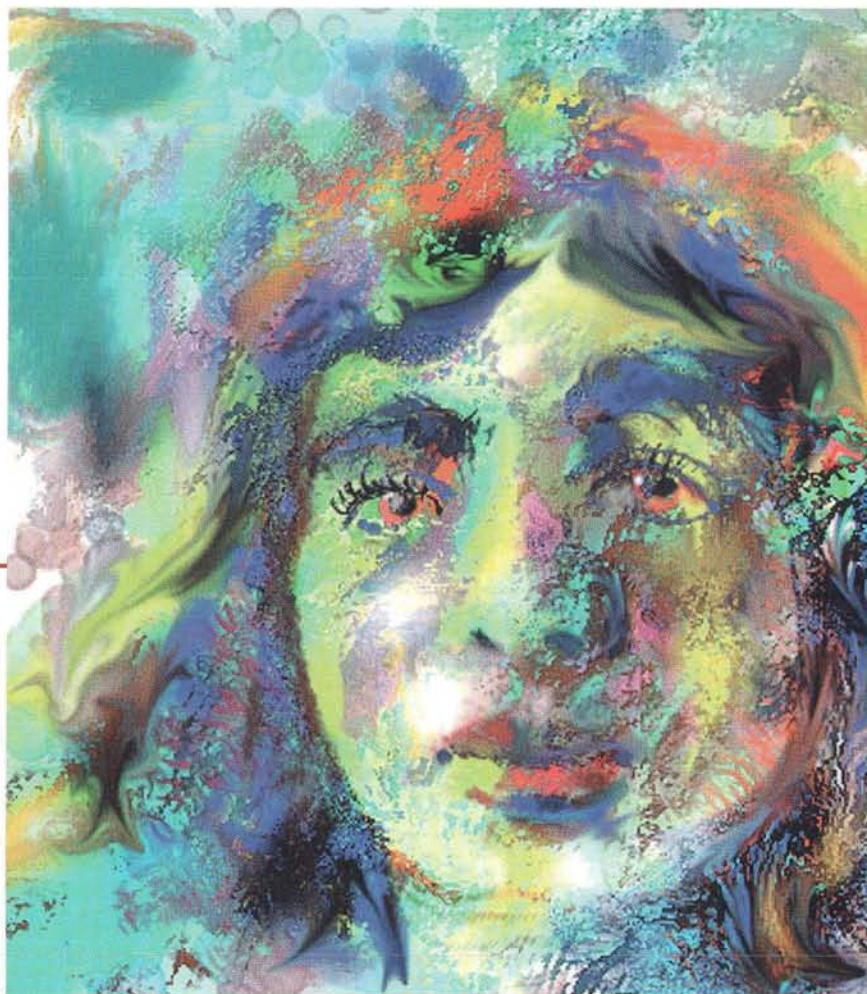
1 To create the Viscous Mix brush, Sutton set Brush Type to Felt Pens; he set Brush Variant to Felt Marker, Method Category to Wet (simulating a watercolor brush in the Wet layer); and he changed Method Subcategory from its default, Soft Variable Buildup, to Grainy Wet Abrasive.



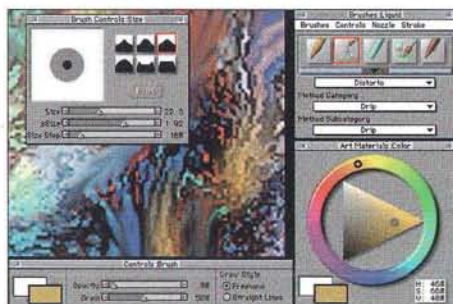
2 In the Size palette, he moved the Size slider to 6.1 and the \pm Size slider to the maximum; he entered 5 percent as the Size Step to set a minimum and maximum brush diameter that he could adjust interactively by changing parameters in the Advanced Controls: Sliders palette. There he set Pressure to modify Size; this let him vary the brush size as he painted—the more pressure he used, the larger the brushstroke.

3 For the brush called Mountain Crumple (used to create the red and yellow spongy texture visible in the top of the hair), he chose the Mountains paper texture (from the Texture Sampler library). He set Brush Type to Watercolor, with Broad Water Brush as the variant; he set Method Category to Buildup, and changed Method Subcategory from the default, Soft Buildup, to Grainy Soft Buildup.



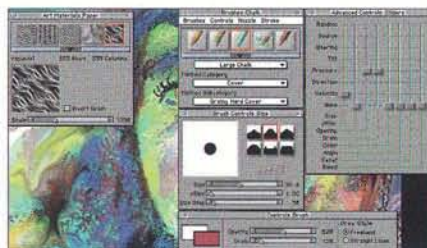


4 These changes applied brushstrokes to the background canvas, rather than the Wet layer, which brought out the grain of the underlying paper texture by applying color to the upraised areas and darkening that color.



5 To create the Colored Distorto brush, Sutton used Liquid as the Brush Type, with the Distorto variant; he chose Drip as both the Method Category and the sub-category. After setting Opacity to 8 percent, he changed the color to a yellow-orange and painted over a blue area.

6 For the hair, he used a standard large chalk with a paper texture, Rapunzel, from a library called Textures 2. Using Invert Grain and moving the grain slider down to 12 enabled him to apply color only to the raised areas of the paper texture, the wavy lines that make up the hair.



THE TOOLS

Hardware: PowerBook 280c with 24MB of RAM and 325MB internal hard drive; Wacom ArtZ II 6-by-9-inch graphics tablet.

Software: Fractal Design Painter 4.0.

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MERISEL

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Buyers' Tools

Affordable Color Printers

INK-JET DEVICES MAKE COLOR ATTRACTIVE, DESPITE SLOW OUTPUT

by Peter M. Stoller

Only a few years ago, "affordable, quality color printing" was an oxymoron. Today, it's a standard term in the SOHO (small office/home office) lexicon—printed in four-color liquid ink. Low-cost color ink-jet printers are used daily for everything from colorful correspondence to eye-catching presentations. The available print stock—from plain paper to transparency film—helps make an ink-jet printer surprisingly versatile.

With this growing variety of applications has come a growing variety of printers. To help you pick the right one for your needs, we compared six current mainstream models. All work on the same principle: spraying dots of cyan, magenta, yellow, and (with one exception) black ink to reproduce a rainbow of colors. (The Canon BJC-210 combines the three primary colors to produce black.) That doesn't make the printers the same, though; indeed, we discovered just how different they can be.

Macworld Lab subjected the printers to a battery of speed tests, pumping out reams of text and complex graphics and photographs. Then we laid output samples before our panel of experts, who judged image quality. We found several good options—but the right choice depends on your needs.

Expect to Be Impressed

The strength of ink-jet printers is their ability to produce high-quality output at a reasonable cost. These machines print at resolutions as high as 720 dpi—higher



KEVIN CANDLAND

than many laser printers. That doesn't mean better output, though. Ink soaks into paper, blurring details. But using special coated papers can reduce ink spread.

Our panel compared the printers' plain- and glossy-paper output of an Adobe Illustrator EPS graphic, an Adobe Photoshop color photo, and a multifont Microsoft Word document.

The Canon BJC-4100 was the favorite in all the plain-paper tests, with the richest colors and clearest details. Apple's StyleWriters are based on Canon print engines, yet the StyleWriters' output was inferior to the 4100's; we credit the driver, from GDT Softworks' PowerPrint driver/cable package (604/

291-9121; \$149), for the BJC-4100's superior output. (We used GDT's software because it is the only Macintosh driver available—Canon does not provide a driver.)

That result surprised us. With its own driver, the StyleWriter 2400 prints at 720 by 360 dpi in black-and-white mode, while the BJC-4100 with GDT's driver supports only 360 by 360 dpi, yet the BJC-4100's output quality was superior (GDT says its 720 by 360 upgrade should be available by the time you read this).

The Epson Stylus Pro has the highest resolution, 720 by 720 dpi. However, that resolution requires special paper; on plain paper the Stylus Pro is restricted to 360 by

360. The Stylus Pro washed out on graphics at 360 dpi, but it did fine on text—which is what you'll care most about when printing on plain paper.

The Hewlett-Packard DeskWriter 660C was a distant last on the text test; its output was so oversaturated that the entire document appeared to be in bold type, even in Best mode at 600 by 600 dpi—the highest plain-paper resolution of any printer we tested.

When we switched to glossy paper, the Stylus Pro shone. At 720 dpi, it easily took the gold for the Photoshop and text tests. Unfortunately, it exhibited severe banding in otherwise excellent Illustrator output, giving the BJC-4100 with PowerPrint the edge.

But in our Illustrator test, Apple's 2400 gained an even bigger edge when we installed GDT's \$149 StyleScript, an Adobe PostScript Level 2 interpreter just for StyleWriters. In fact, the 2400 jumped from the bottom of the heap to first place. The StyleScript output earned a nearly perfect score from the judges.

Holding down the low end were the HP DeskWriter 660C and Color StyleWriter 2200. The former had poor color accuracy and blocky text; the latter, a miniature printer geared toward travelers, produced slightly washed-out colors and lost some image detail.

Color Ink-Jet Printers: Quick Facts on Slow Printing

Company	Printer	Star Rating ^A	List Price	Telephone
Apple Computer	Color StyleWriter 2200	★★★★/7.0	\$419	408/996-1010
	Color StyleWriter 2400	★★★★/7.2	\$429	408/996-1010
Canon Computer Systems	BJC-210	★★★/6.2	\$299 ^B	714/438-3000
	BJC-4100	★★★★/7.1	\$399 ^B	714/438-3000
Epson America	Epson Stylus Pro	★★★★/7.2	\$999	310/782-0770
Hewlett-Packard	HP DeskWriter 660C	★★★/6.3	\$499	208/323-2551

^A Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) ^B Requires Epson's special coated paper; restricted to 360 × 360 on plain paper.

Expect to Wait for Output

If quality output and cost-effectiveness are an ink-jet printer's strengths, speed is its weak spot, due to slow print mechanisms, serial-port bottlenecks, and dependence on the Mac for image processing. This last point means print speeds vary with different Mac models; note that only the Apple and GDT drivers are Power Mac-native.

Even with Power Mac-native drivers, print speed for a full-page graphic was about 10 minutes in our tests. The DeskWriter 660C took two to three times as long. The Stylus Pro took a mere 5 to 6 minutes per page at 360 dpi, but switching

to 720 dpi quadrupled print time—not surprising, since a 720-dpi image contains four times as many pixels as a 360-dpi one. (See the benchmark “Performance: Color Ink-Jet's Achilles Heel.”)

For printing black-only documents, Apple has an ace up its sleeve: the High-Performance Black Ink Cartridge, which is included, increased speed more than three times. (Canon projects similar performance gains with its black-only cartridges, available as an option.)

Driver settings also impact printing speed. In the most extreme case, the Stylus Pro printed text more than six times as fast when set to 360-dpi, high-speed

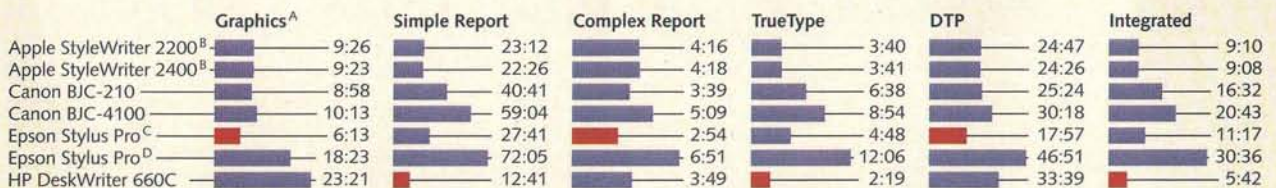


Performance: Color Ink-Jet's Achilles Heel

The ideal color printer would, of course, print instantly, produce perfect output, and cost nothing. But when you shop for a printer in the real world, you have to stake a claim somewhere within the three axes of the ideal. Color ink-jet technology gets you

pretty close to cost-free; it also gets you within sight of perfect output. Unfortunately, where color ink-jet lets you down is in printing speed—some of the printers we benchmarked took several minutes *per page*, even on relatively simple documents.

■ Best result in test. Products are in alphabetical order. All times are in minutes:seconds. Shorter bars are better.



^A Averaged scores of three tests (printer ranks and score spreads are similar in all three). ^B Performed some text-intensive tests about three times as fast when equipped with all-black cartridge than when equipped with standard four-color cartridge. ^C Set for 360 dpi. ^D Set for 720 dpi.

BEHIND OUR TESTS

Macworld Lab tested the printers with a series of real-world files. The Graphics score is an average of print times for an Illustrator file, a Photoshop file, and a PowerPoint file; because none of the printers have built-in PostScript, print times for PostScript and non-PostScript graphics were quite similar, and other graphics applications should show similar performance. The text-intensive tests, in particular the Simple Report test with a single font in three styles, require little processing and are therefore good tests of each printer's print engine. The DTP and Integrated tests mix

PICT, TIFF, and EPS images and colored text in a variety of fonts to see how each printer copes with complex files.

We tested all printers on a Power Mac 7100/80 running System 7.5.1 with 24MB of RAM and an internal 700MB hard drive. All printers were connected to the serial (modem) port. Both Canon printers required GDT Softworks' PowerPrint. Drivers were configured for best quality.—Macworld Lab testing supervised by Mark Hurlow and Jeff Sacilotto

Maximum Resolution	Ports (included/optional)	Options	Warranty (in years)
720 x 360 black; 360 x 360 color	serial/none	GDT StyleScript \$149; battery attachment \$129; rechargeable battery \$79	1
720 x 360 black; 360 x 360 color	serial/LocalTalk \$105	GDT StyleScript \$149	1
360 x 360	parallel/ ^c	BC-02 black-only cartridge \$25	2
360 x 360	parallel/ ^c	BC-20 black-only cartridge \$29	2
720 x 720 ^d	parallel, serial-LocalTalk \$149; Ethernet \$499	Epson PostScript interpreter with Pantone color calibration \$250	2
600 x 600 black; 600 x 300 color	serial, LocalTalk/none	none	3

nation.) ^a Requires PowerPrint (\$149; GDT Softworks, 604/291-9121). ^c GDT Softworks' PowerPrint/LT (\$299 for 25 users) provides

mode, and black and white, than with standard settings. At 2 pages per minute, it performed fastest. At 720 dpi, however, text printing was so slow that we'd reserve it for applications where high-quality text is critical.

Fill 'Er Up

Refills are a substantial hidden cost of operating an ink-jet printer—up to \$35 for color ink alone. The Canon and Apple ink tanks ran out midtest. The Epson and HP cartridges didn't, thanks to their larger capacities. Epson's and HP's consumables are less expensive than the other vendors', but how much less is hard to gauge. Estimates for consumables' life spans vary widely from vendor to vendor, being based on different—and dubious—criteria. We didn't come close to Apple and Canon's estimated 100 pages per ink tank, for example, because we printed full-page graphics, while they base their estimates on far less ink per page. Even using Apple's generous estimates, the Color StyleWriter 2200 costs a sobering \$1.10 per color page for ink alone about three times as much as any other printer.

You'll be refilling more than just ink wells, of course. All these printers come standard with a 100-sheet plain-paper tray, save the Color StyleWriter 2200, which takes only 30 sheets. They all handle a wide variety of media types and sizes. At \$25 for 200 letter-size sheets, Epson's special 720-dpi paper isn't cheap, but some other premium coated papers cost as much.

Talking to the Printer

Users can share Apple's StyleWriters via the bundled ColorShare software, but

ColorShare ties up the host machine whenever anyone on the network prints. A \$105 option adds LocalTalk networking to the Color StyleWriter 2400, but that option is not available for the Color StyleWriter 2200.

Epson offers both LocalTalk and Ethernet options for the Stylus Pro, at \$149 and \$499, respectively. Ethernet, though pricey, would really speed up those 720-dpi data transfers. For the Canon printers, GDT offers PowerPrint/LT (\$299 for 25 users) for LocalTalk networking—not exactly economical compared with Apple's and Epson's hardware options. Only HP's DeskWriter 660C comes with LocalTalk as standard equipment.

Getting Set Up

The Color StyleWriter 2400 comes ready for the desktop, but batteries aren't included with the portable Color StyleWriter 2200. For true portability, you need the \$129 battery attachment. Both the DeskWriter 660C and the Stylus Pro lack a serial cable; the cable is less than \$10 extra, but think how you'd feel if you got your new printer home and then discovered you couldn't use it.

Aside from this, setup couldn't be easier. Installing the ink cartridges is literally a snap. Then you just plug in a cable, run an installer, and restart. It shouldn't take more than ten minutes to get any of these printers up and running.

The Last Word

We weren't wowed by the DeskWriter 660C's poor output and speed, nor by Canon's also-ran BJC-210, but all the other printers are fine choices for the right user.

The Stylus Pro costs twice as much as the other printers, but you get what you pay for in print quality and flexibility. For the best graphics in this bunch, get the PostScript option and the special paper—and a deck of cards for playing solitaire. If you print only business letters and bar graphs, the Stylus is overkill.

The BJC-4100 and Color StyleWriter 2400 are nearly identical. With PowerPrint, the BJC-4100 prints slightly better and costs slightly more. Apple's printer comes with ColorShare, works with StyleScript, and has a relatively inexpensive LocalTalk option. The BJC-4100, however, has a longer warranty and works with PCs; the StyleWriter is Mac only. Either one will nicely complement the average desktop.

Finally, the Color StyleWriter 2200 is the only choice for color printing on the go, and it's close to the equal of the Color StyleWriter 2400 in output quality. However, the high cost of consumables and the lack of a LocalTalk option make it appropriate only for road warriors. **m**

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COLOR INK-JETS



Macworld Lab tested six color ink-jet printers to compare for speed, color accuracy, and image clarity.

High End

★★★★/7.2 **Epson Stylus Pro** This printer is in a class by itself when it comes to output quality and features. For an ink-jet it's expensive, but graphics professionals should consider it as a low-cost alternative to a dye-sublimation printer. **Company:** Epson America. **List price:** \$999.

Midrange

★★★★/7.2 **Color StyleWriter 2400** It produces exceptional PostScript graphics with GDT StyleScript. **Company:** Apple Computer. **List price:** \$429.

★★★★/7.1 **BJC-4100** This printer noses past Apple's StyleWriter 240 in most output-quality categories. **Company:** Canon Computer Systems. **List price:** \$399 (requires PowerPrint, \$149).

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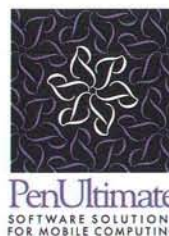
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Communicating With Newton



If you thought you had to be plugged in and sitting down to send e-mail, receive a fax, check out a CompuServe forum, or surf the Web, it's time to think again.

BY NICK WINGFIELD

A computer without communications features is like a cat without its meow. Like it or not, we're knee-deep in modems, e-mail, Web surfing, and network computing, thanks in part to the radical growth of e-mail and the Internet.

With mobility as their *raison d'être*, the newest generation of personal digital assistants are really two-part computing devices: part personal information manager, part intelligent communicator. For these purposes, PDAs like Newton are far superior to laptops for on-the-go users (see sidebar, page 4). Instead of lugging a \$2,000 laptop along on business trips just so you can check e-mail and your schedule, you can get a PDA with the same capabilities for a third of the price and an eighth of the weight.

"E-mail and scheduling are exactly the kinds of applications I expect my Newton to replace," says Sandy Smallens, senior director of multimedia at Atlantic Records, based in New York. "Laptops are a pain in the ass to check in at airports."

To this end, Apple built its radically improved Newton 2.0 operating system from the ground up with mobile communications in mind, and its resident e-mail, fax, and desktop connectivity facilities show several marked improvements. Yet many of the most useful of Newton's communications-centered applications aren't coming from



REAL PEOPLE

Michael Dorf: Timing the Music

"In the music business, you gotta be cool," says Michael Dorf. As **president of the Knitting Factory, Manhattan's avant-garde jazz club and record company**, Dorf found that carrying a laptop backstage—where he does most of his concert and festival scheduling—was not only awkward, but decidedly uncool. "I'm on the business side of things, but I still have to look hip."

Dorf, who has used a PowerBook since day one, says that his recent conversion to an Apple Newton 2.0 MessagePad 120 from a laptop has not only upped his hipness factor, it's given him greater flexibility. "When I'm at a club, I don't want to be carrying around a PowerBook or, for that matter, a briefcase. Now, because of my PDA, I don't need either. I'm hands free."

Dorf relies primarily on the calendar program *Now up to Date!* (Now Software, 800/275-1669) which runs on his PDA as well as the networked Macs in the main office. "To have the Knitting Factory's complete calendar right at my fingertips is a big advantage," says Dorf. "Now, no time is wasted. If I've had a conversation with someone backstage—whether it's in Tokyo, Zurich, or uptown New York—I'm able to relay that information immediately back to the company and synchronize calendars."—**Leslie Crawford**

Cupertino, Apple's home town, at all. Independent software and hardware developers are driving much of the innovation behind Newton communications, from two-way wireless PC cards to LAN e-mail clients to World Wide Web browsers.

On the E-Mail Trail

With Newton 2.0, Apple succeeded in making all of the PDA's resident applications a kinder, gentler experience. (The new operating system even won the Fall Comdex '95 Best of Show award.) For example, handwriting recognition, which so limited the original Newton's usefulness, is radically improved. But nowhere is the benefit more obvious than when you compose e-mail.

Out of the box, Newton 2.0 does include some basic networking capabilities in the form of AppleTalk, Apple's LAN protocol software. Through the serial port, you can plug into a networked printer or synchronize your

Newton data with Newton Connection Utilities (see sidebar, page 10) running on a server. But if you want to send or receive e-mail or faxes, you'll need a modem. For some mysterious reason, Apple refuses to put an internal modem in the MessagePad (Apple's Newton hardware, of which there are a few versions). This forces Newton users who want e-mail or fax capability to purchase a separate modem, which is about the size of a KitKat candy bar, or a more sleek PC card fax modem.

Once you've got the modem, however, Newton's resident fax and e-mail communications capabilities get you moving right along. For example, its built-in e-mail client for Apple's eWorld online information service allows you to exchange text messages with other eWorld members on Macs, Windows PCs, and Newtons. With eWorld's Internet gateway, subscribers can also send e-mail to Internet users, as well as to

Newton Versus the Laptop: Which Is Better?

Like other PDA devices, Newton is clearly a cousin to another kind of mobile computer: the laptop. The two devices support the same basic communications applications: fax, e-mail, and information access through software such as Web browsers or database clients. As with Newton, laptop users rely on synchronization software to keep their mobile applications in touch with desktop computer applications. With Apple's recent release of a mid-sized keyboard that plugs into Newton's serial port, it's even tempting to call Newton a pint-sized lap-

top of sorts. And if you're ready to put down around \$90, you get an input device that never has handwriting-recognition problems.

But, when choosing a communications platform, it helps to align expectations with reality. Newton isn't designed to deliver

the kind of horsepower, graphics capabilities, and overall flexibility that laptops can. Nor can PDA users plug into a network like the Internet as full and equal peers to desktop and computer users. While your cohorts with PowerBooks and ThinkPads are opening e-mail with attached

Microsoft Word documents, you and your PDA-using sisters and brothers are limited to ASCII text e-mail.

Also, contrary to what you were taught as a teenager, size does matter. Newton's smallness is its chief asset, but smallness also means sacrifices in screen quality. Some experts say Newton's tiny screen seriously limits its appeal as a platform for e-mail and other communications applications.

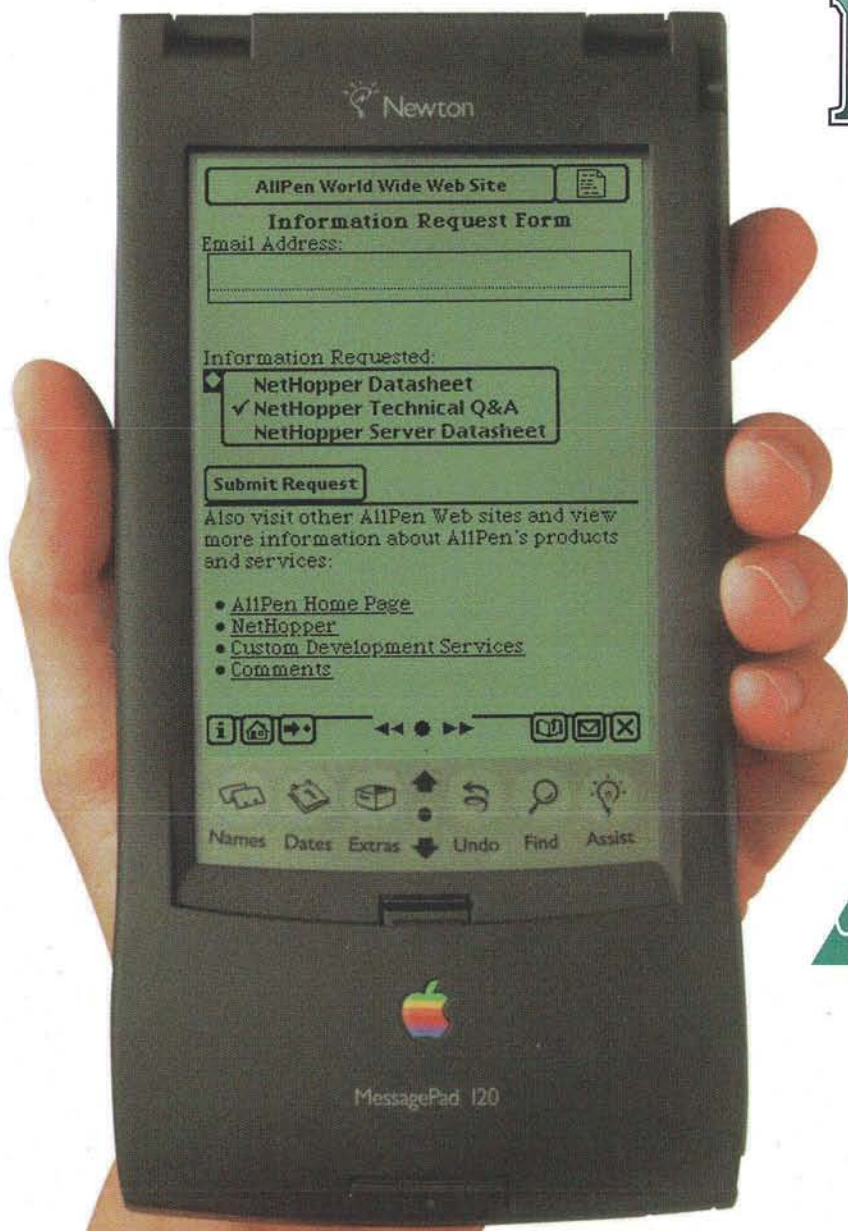
Still, if all you really need is a personal information manager that can let you talk to the outside world—and it with you—you may find Newton an intelligent investment. And it sure relieves the pressure on that sore lower back.—**N.W.**





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REAL PEOPLE

Victor Zauderer: Breaking Out of Books

Victor Zauderer's life may be wrapped up in the paperbound world of book design and publishing, but he spends most of his working hours reading and writing with a Newton. A director for *The Understanding Business*, a publishing and book design firm located in San Francisco, California, Zauderer is virtually bound to his Newton 2.0 MessagePad, using it to send and receive faxes, send and receive e-mail, take notes, make call logs, track his time, and schedule appointments. "It's never out of my hands," he says. "I can write up an entire contact in less than a second."

The *Understanding Business* publishes graphical, easy-to-understand books such as the *Access Travel Guides* (recently sold to HarperCollins). In addition to using the Newton all day long to manage their business, Zauderer and his colleagues test-drive their publications through other people's PDAs. From an address on the World Wide Web (<http://www.info.apple.com/newton>), Newton users can download general information about a book's contents, a sample of writing, and information about and how to purchase it. The company also plans to ship its publications in both print and electronic MessagePad form via Newton online interest groups and Web sites and *Understanding's* own Web site.

Zauderer thinks the MessagePad is a logical way to market and publish sophisticated information. "People who buy Newtons are already a very specific group who are interested in complicated topics," he says. "It's a perfect communications vehicle." —Marie D'Amico

subscribers to commercial online services, such as America Online, CompuServe, and Prodigy. The resident e-mail software also allows you to exchange any Newton object—for example, a business card from Names, a calendar appointment from Dates, or a NotePad drawing—with other Newton users. (Unfortunately, Mac and Windows PCs can't receive Newton objects, just plain text.)

In addition, Newton 2.0 lets you send a fax or e-mail to multiple recipients through a batch transmission feature. (Beaming, which allows Newton to wirelessly exchange objects with other nearby Newtons, also supports batch transmissions, as well as the exchange of software packages.)

Newton 2.0's built-in communications capabilities aren't perfect: though Newton's In Box makes it easier to receive faxes, Newton's resident e-mail client still lacks some basic filtering capabilities, for example, that would allow you to reject incoming messages over a certain size before they're downloaded or to file messages automatically from a particular sender into a designated folder.

Fortunately, independent software vendors (ISVs) aren't waiting around for Apple to take care of these issues. A host of third-party developers now provide add-on applications that fit a range of communications needs. (Indeed, the breadth of third-party products available really demonstrates how far Newton has come as a platform.) Here's a roundup of the chief offerings.

ONLINE SERVICE APPLICATIONS If you're not an eWorld fan, there's no reason you can't use your favorite online service. America Online aficionados can use Catamount Software's (802/863-5256) Aloha, a simple \$50 program that allows you to send and receive e-mail from your AOL account via modem. Another

firm, Black Labs (303/938-8580), has created a Newton client for the CompuServe Information Service (CIS) called CIS Retriever (\$99), which allows users to access CIS discussion forums, news, and stock quotes, in addition to e-mail. The company offers a similar software program for First Class bulletin board systems, called FirstClass Retriever+ (\$99). There's also a more generic, less graphical communications program from Ex Machina (212/843-0000), PocketCall (\$119), which lets users access CIS e-mail and forums, as well as text-only BBSs and Internet UNIX-shell accounts provided by companies such as Netcom.



LAN E-MAIL Newton's success as a personal communicator for mobile professionals depends, at least partly, on how well it integrates with office information systems. For users of QuickMail, a LAN-based e-mail software package for Macintosh and Windows PCs, CE Software (515/221-1801) offers En-

Route, a \$129 Newton client for remotely accessing e-mail on QuickMail systems via modem. EnRoute allows you to view your QuickMail in box online so, for instance, you can avoid downloading e-mail with bulky attachments. It also integrates nicely with Newton's resident NotePad and Names applications, with a cool feature for simplifying addressing of QuickMail messages. CE Software also offers a wireless e-mail client, called MobileVision (\$875 for five users). Designed for use with Motorola's Marco wireless communicator, the software forwards mail from QuickMail, Microsoft Mail, and cc:Mail systems to Marco, employing user-defined criteria to filter messages.

Users on Microsoft Mail and Lotus cc:Mail LANs have a wired option to chose from as well: River Run Software

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It not only organizes, it communicates.

The MessagePad 120 works with the way you communicate today. It can send and receive faxes. It also allows you to receive wireless paging messages and news bulletins. You can exchange e-mail via the Internet. It even has an optional keyboard so you don't have to carry a laptop.



An easy connection to your PC.

The new MessagePad 120 connects to both Windows and Mac® OS-based computers. So you'll be able to create backup files, take your PC files with you, or access your PC from the road. That's because, with new connection software, you can easily download and upload data from your personal computer to your MessagePad 120.

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The New Apple MessagePad 120



REAL PEOPLE

Dr Steve Labhoff: Walking the Wards

Two years ago, when Dr. Steve Labhoff took charge of implementing computer technology to make physicians' jobs easier, he went straight for the Newton. "The doctors I work with need drug dosage, medical records, and other information quickly," says Labhoff, a research associate of internal medicine at the Decisions Systems Group of Harvard Medical School's Brigham Women's Hospital. "But this information is stored usually somewhere else—in a library, say, or in the medical records department."

Believing that PDAs have great potential for accessing this data, Labhoff launched the Constellation Project, a study conducted at Brigham Women's Hospital and Massachusetts General Hospital. Labhoff approached K2 Consultants (603/551-5544), a New Hampshire-based software design company, to design a custom medical reference package.

The K2 software includes a drug information handbook from the Texas electronic publishers, Education Research Laboratories, and the Medical Knowledge Self-Assessment Program from the American College of Physicians. It also includes a manual the residents wrote for interns, a medical calculator designed by Labhoff, and a phone book of residents in five local hospitals. "K2 created an indexing scheme that allowed the software to function quickly," explains Labhoff. That way, a doctor can look up a drug in ten seconds or less. —L.C.

Group's (203/861-0090) Mail on the Run! (\$129). Instead of connecting directly to an e-mail server, Mail on the Run! provides remote access to LAN e-mail by connecting to a user's Windows 3.1 or Windows NT workstation back in the office. That means you need to have a modem attached to your office workstation and to have your computer turned on at all times. Businesses with multiple Mail on the Run! users will probably want to dedicate a Windows NT. Qualcomm's (800/238-3672, ext. 6087) Eudora Light for Newton (free with the desktop version of Eudora, which costs \$89) connects via modem or serial connection to a Mac workstation (a Windows version is on the way) running the desktop version of Eudora. This enables users to transfer messages between PC and Newton. While useful, the product isn't really a full-fledged e-mail client, but rather an offline e-mail browser.

THE WEB E-mail may be the killer application of the Internet, but the Web is definitely the sexiest one. Enter AllPen Software (408/399-8800) with its NetHopper Web browser for the Newton (\$50). The company has wisely chosen to create a text-only browser so that Newton doesn't get clogged by Web page graphics, though users will still have an interface and features similar to the Mosaic and Netscape Web browsers, including the ability to follow hyperlinks. The software comes in two configurations: a client-server package that enables up to 20 Newtons to surf the Web through a Macintosh Internet server and a more consumer-oriented version that connects directly to the Internet through what's called a SLIP/PPP account. This last version is contingent on Apple's February release of a Newton version of TCP/IP.

Newton TCP/IP software will definitely benefit more applications than NetHopper and allow a greater degree of access to the Internet. In fact, some people think this could be Newton's calling. "An application that taps into the Web would sell more Newtons than anything else," says Steven Erde, director of the Office of Academic Computing at Cornell University Medical College in New York. "One of the things that's imperative is the ability to do a direct connect to the Internet, and Apple already has this fantastic appliance in the Newton."

Newton Unplugged

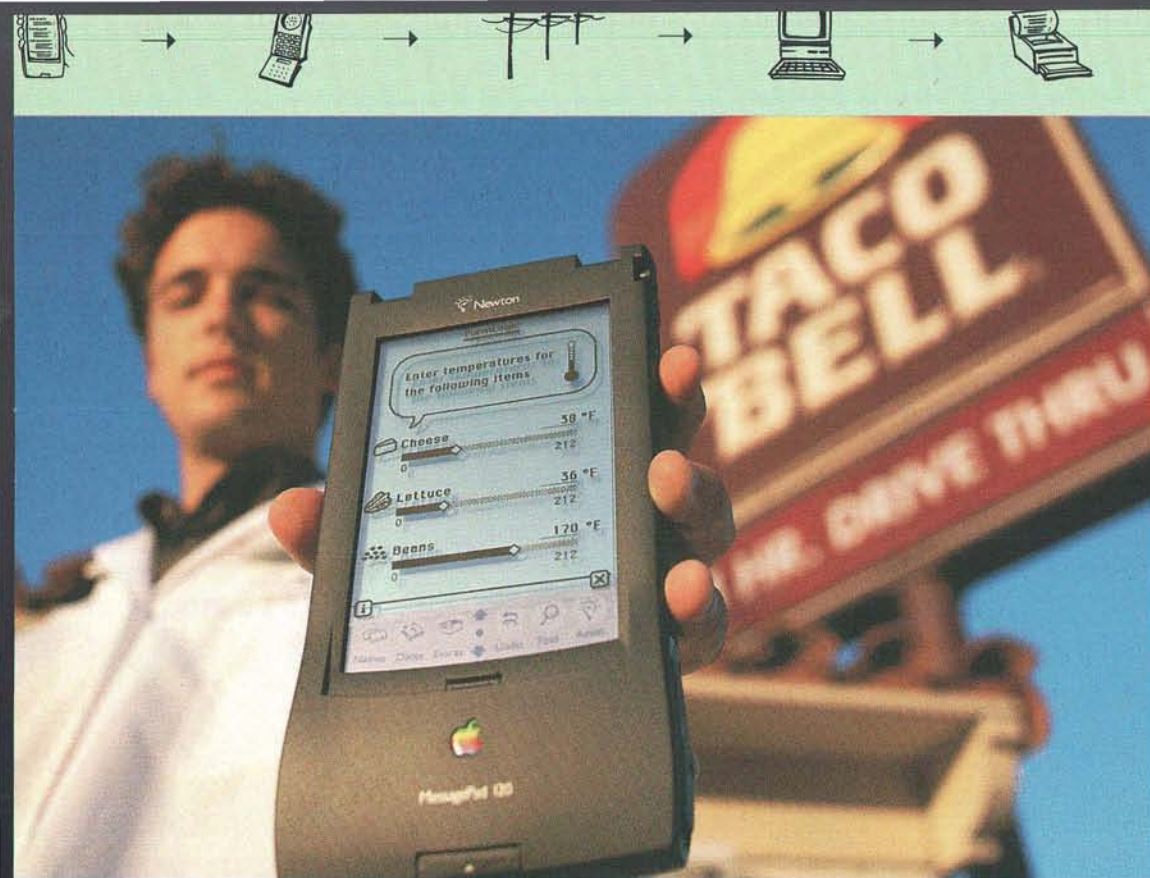
Given their druthers, most users would like access to e-mail or the capability of sending a fax whenever they please, wherever they are—in an elevator, in a car, walking down the street. For Newton users who prefer to have no strings attached, here are some options.

TWO-WAY COMMUNICATIONS For those who want two-way wireless communications from their Newton in a tightly integrated package, the obvious choice is Motorola's Marco (800/894-7353). In addition to all of the standard features of Apple's MessagePad products, including PC card slot and serial port, Motorola's Newton comes with a built-in radio modem for connecting to Ardis, a nationwide wireless data network. (Unfortunately, Motorola has no plans to see a Newton 2.0 version of Marco—the device currently runs on



Newton 1.5—nor does it have any plans to offer a Newton 2.0 upgrade for existing Marco users.)

For users willing to stick with the older Newton operating system, Marco offers writers two e-mail options to choose from. The first, Radio Mail (free with Marco; 800/597-6245) gives users



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REAL PEOPLE

Jacquelyn Baas: Art History in Your Hand

In most art museums, human tour guides—some more interesting than others—explain the history and technique behind the paintings and sculptures to tour groups and school kids. But you can get a personalized guided tour on your hand-held Newton at the **University Art Museum at the University of California, Berkeley**, where museum director **Jacquelyn Baas** says that the technology “represents our commitment to making art accessible.”

The University Art Museum’s “pocket curator,” developed by Visible Interactive (415/433-7781) of San Francisco, lives in a Newton 2.0 MessagePad 120 with specially added backlighting, a fingertip user interface, headphones, heaps of memory, and a handy pouch. Turn it on, and you get a personal, interactive audio guide of the museum as you walk through it. The pocket curator discusses the exhibits in which you’re interested, when you want, for as long as you want.

The MessagePad’s IR port detects your location, and the unit can display choices based on the specific room into which you’ve wandered. The device describes a museum space, a room, or a painting, while you are touring; it can also schedule a tour for available time and print out the tour later.

“Now the tour can follow you instead of you following the tour,” says Richard Rinehart, information systems manager for the University Art Museum.—**Marie D’Amico**

an e-mail account connected to the Internet. Targeting mainly Marco workgroups, Ardis Personal Messaging (free with Marco), on the other hand, provides an e-mail address that is accessible only to other subscribers to Ardis Personal Messaging. Besides e-mail, both Radio Mail and Ardis Personal Messaging offer fax and selected information services, including stock and news updates, though there are extra charges for both. Motorola has also kick-started development of other Ardis-based services aimed at vertical markets (see the sidebar on desktop to Newton connectivity, below), and some mail packages, such as Mail on the Run!, also support Ardis connections.

Apple MessagePad owners also have two-way options to choose from. Motorola offers an add-on wireless modem for the Ardis network, called the Personal Messenger 100D (\$750). This device is a type II PC card that slides snugly

into the MessagePad’s card slot. With it, users can access Radio Mail and vertical applications developed for Ardis. Just to complicate things, there’s another nationwide wireless data network, RAM Mobile Data, that is virtually identical to Ardis. To tap into the RAM network, you’ll need Megahertz’s (800/527-8677) AllPoints Wireless PC Card (\$499). Once you’re riding the airwaves, you can choose from Radio Mail or Wynd Communications’ (800/549-6000) Wynd-Mail, which includes e-mail, fax, and a feature for converting e-mail messages into synthesized voice phone calls.

THE VERTICAL CLIMB Hardware vendors are also setting their sights on vertical markets with Newton-compatible devices for creating wireless local area and wide area networks. With Dayna Communications’ (800/443-2962) Roamer PC card and serial devices, Newton users can wander wire-free within 150 feet of a LAN access



Desktop to Newton Connectivity

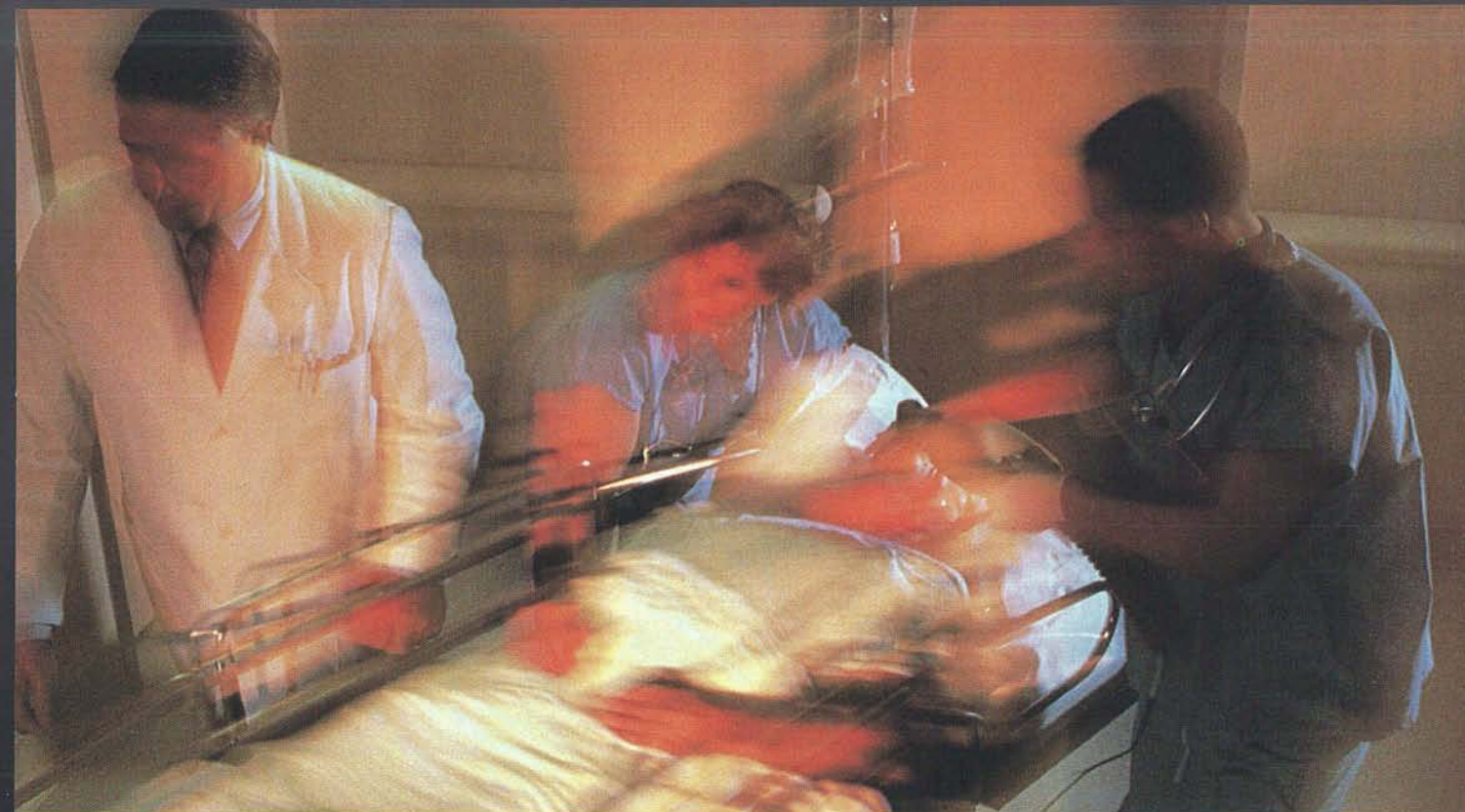
There are two “Cs” crucial to Newton as a platform: communications and connectivity. The latter enables Newton’s resident applications to stay in touch with desktop PC applications such as personal information managers and databases. Without desktop connectivity, many Newton users’ lives would effectively become schizophrenic, with data in parallel PC and PDA applications growing gradually more dissimilar.

Apple’s answer to this problem is Newton Connection Utilities, a set of

software programs for Macintosh and Windows PCs that provides file synchronization capabilities between Newton and popular Mac and Windows PIM applications, such as Claris Organizer, TouchBase Pro, and NetManage’s Ecco. Newton Connection Utilities also provides data backup capabilities so you have a copy of Newton’s data on your computer hard disk. With Newton 2.0, users can perform synchronization and backup one of three ways: serial cable, LocalTalk, or modem.

Ultimately, Newton Connection Utilities may be eclipsed entirely by di-

rect synchronization features between desktop applications and Newton. Seeing NCU as an extra step to linking both platforms, Apple is encouraging developers with software tools to embed “Synchronize With Newton” capabilities in their desktop applications. Already some have started, including Team Coordination (514/481-4647) with its TeamAgenda Mac scheduling software (\$549 for five users) and Now Software (800/275-1669) with Now Contact and Now Up-to-Date, two Mac PIM applications (\$150 plus \$30 for a synchronization module).—**N.W.**



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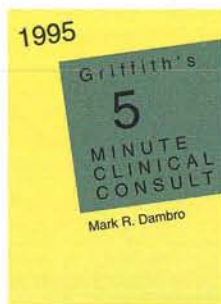
Reference information is rarely available where it's most valuable—at the point of care. With the ERLI electronic medical references, a Newton PDA becomes a mobile medical library, keeping key reference sources readily available at home or hospital, examining room or OR. Our Professional Medical Reference Series includes many of the most frequently used texts—Drug Information Handbook, 5 Minute Clinical Consultant and DSM-IV—and most are updated annually.

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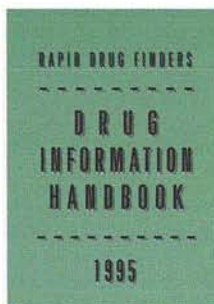


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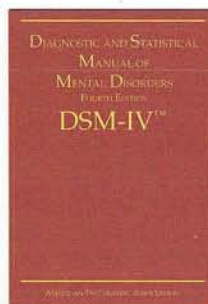
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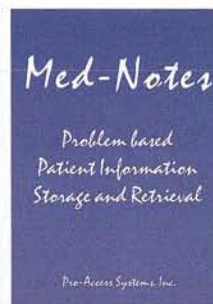
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Circle 27 on reader service card

Friends in Need: Where to Get Support

With Best of Comdex kudos and glowing press reviews to back them up, Apple's MessagePad 120 loaded with the Newton 2.0 operating system "has been selling itself," according to George Giakoumnakis, a sales representative for J and R Computerworld, a large retail outlet in New York City. "A lot of people come in and say, 'Give it to me,' without asking any questions. With the older one you had to do a lot more explanation."

While the new Newton is unquestionably easier to use, the hardware and software can

take some getting used to. In most cases, purchasers can receive rudimentary support and training from the dealer to get over the learning hump. But chances are that if you purchase a Newton from a store that also sells stereos and vacuum cleaners, you might not be getting the technical expertise that you need to answer tough questions.

Apple already provides a one-year warranty on the hard-

ware along with telephone support (800/767-2775) for the \$699 product. Though get-

ting through on Apple's 800 line may make you wish you had taken up a time-passing hobby like knitting, the support comes straight from the horse's mouth.

Another excellent alternative is to purchase a Newton from one of the four Newton

Source stores (in San Francisco, Los Angeles, New York, and Chicago; call 800/639-8661 for information). These stores specialize in Newton and nothing but Newton, and their staffs know everything about both hardware and application software. Newton Source will preload the software you want and provide training; you can also sign up for lifetime on-site and telephone support. If something goes wrong, you can send your PDA in and receive a replacement within 48 hours while your unit is under repair.—Bronwyn Fryer



point indoors, 700 feet outdoors. The device uses the unlicensed radio spectrum, so businesses don't have to pay a monthly service fee. Digital Ocean (913/888-3380) has taken the integration between Newton and wireless communications a step further, introducing in January of this year a product called Seahorse. This is a ruggedized device based on the Newton 2.0 operating system with the option of wireless LAN, cellular digital packet data, global positioning satellite, or other wireless modules. A similar program, KPMG Peat-Marwick's (610/995-4400) SaleMate, enables wireless access to SAP R/3 Systems, a corporate sales automation system.

CELLULAR For a more versatile two-way wireless option, you may want to consider a cellular phone instead of a specialized data modem and service. With a cellular phone, Newton users can dial into the same services accessible via ordinary telephones, including online services, with the added bonus of being able to make voice calls. Connecting to AOL via cellular isn't as dependable as a regular phone connection, though; prepare yourself for fluctuations in transmis-

sion speed. You will need a cellular phone, a PC card cellular modem, and a cable for connecting the two devices. There are a number of PC card cellular modems for Newton, including Toshiba's (800/959-4100) NoteWorthy card and Motorola's (800/472-6242) Cellect card, which cost around \$230. The cellular modem may come with a connector cable, but be sure it fits your cellular phone before you buy it.

PAGERS Finally, if you don't have to respond to that e-mail anytime, anywhere, a great alternative to two-way communications is paging. Newton works with several receive-only PC card pagers, including Socket Communication's (800/552-3300) PageCard, priced at around \$399. The PageCard will store messages received when outside of Newton, but it also has some added smarts for assembling longer messages that have been split into multiple pages. It even has its own tiny LCD screen for reading messages, though viewing pages on Newton's screen is infinitely easier. Apple's Newton Systems Group is working on a Motorola NewsCard paging solution for 2.0, which should be available before summer.

Needless to say, you'll want to familiarize yourself with service charges before forking over for a wireless solution. Although pricing varies, you can expect to pay anywhere from \$40 to \$60 a month for average usage on the Ardis and RAM networks. Users on both networks are charged by the data packet sent and received. If you're not careful, those packets can add up to a big Alka Seltzer Moment at the end of the month when you get your bill. Cellular phone users are charged by the duration of their calls, so data calls cost the same as voice calls; as an example, expect a two-page fax to take a couple of minutes to send over cellular.

With Newton 2.0 riding in tandem with some encouraging third-party development, the platform is picking up its pace as an intelligent communicator. Who knows? Within a few years, we may see commuters checking e-mail on their PDAs instead of talking into cell phones. Let's hope their cars are equipped with automatic guidance systems. ■

Nick Wingfield (nick_wingfield@infoworld.com) is an editor at Infoworld who covers wireless communications.

Keep a checklist
of things to do.

Use Notes to take notes in ink text.



Look up
the phone number
of an airline
in your Names file.



Keep a record
of the phone
calls you need
to return.

Create a
checklist
of things
to take on
your trip.



Send e-mail
to colleagues—
even over
the Internet.

Synchronize
your PDA and
PC calendars.

Work smart.

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Import the names
file from your
Macintosh into your
Newton PDA.

Get paged. Then reply to that urgent
message—wirelessly.

Jot down comments
on a fax your boss sent you.



Back up all your Newton
data on your Windows PC.

Use Newton Press
to create a
book about your next
destination.

Use Intuit Inc.'s Pocket Quicken to track your
expenses from your business trip to Maine.

Check your e-mail
using a Newton PDA
and a mobile phone.



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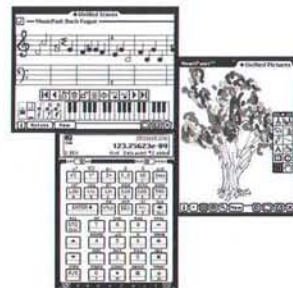
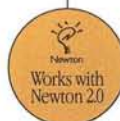


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Mobileware Takes Off



Whether you're on the ski slopes or on the treadmill, here's a selection of Newton 2.0-based software that will let you take your business—and pleasure—with you.

BY BRONWYN FRYER



For the mobility-minded computer user, there are lots of applications out there for Newton 2.0 that can help make working on the go a bit easier—and even a little more fun. Here are just a few.

A SUITE DEAL On the desktop, all-in-one packages like Microsoft Works are an answer to word processing, spreadsheets, and graphics. But when you're in an airport working on a PDA, it's generally pretty tough to cut and paste together a reasonably nice-looking document. Enter AvailWorks, a \$79 software package that lets you create a WYSIWYG document complete with text, graphs, and spreadsheet elements, then shoot it off to a recipient through an included fax modem utility.

Cut and paste text, graphics, and spreadsheet elements together using AvailWorks.

AvailWorks: Avail Technology, 408/730-6855

ILLUSTRATIONS / ROBERT ZIMMERMAN

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FROM YOUR NEWTON TO YOUR COMPUTER

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Macintosh and Windows compatible. Recommended 1MB or greater PCMCIA storage card.

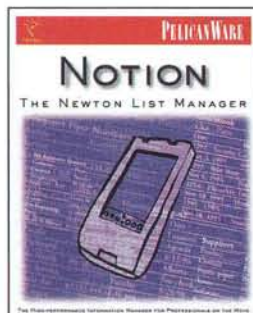
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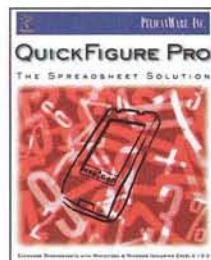
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*Dave MacNeill, Pen Computing Nov/Dec 1995 review of v2.2

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ACT UP Symantec's best-selling contact manager turns your Newton into a great traveling companion. Besides managing contact names, addresses, and to-dos, you can use the \$100 package to sync up with your desktop ACT! package to

establish round-the-clock contact.

ACT! for Newton: Symantec, 800/441-7234

A DATABASE IN A BOX Databases aren't just the bailiwick of the wired-in world. Leverage is a simple, multifile database

program upgraded for the Newton 2.0 platform. You can create your own customized databases, link up with large database applications on the desktop, or link databases together. While the \$139 package supports only nine field types, it's great for simple selection, sorting and reporting.

Leverage: Balcones Software, 512/353-7259

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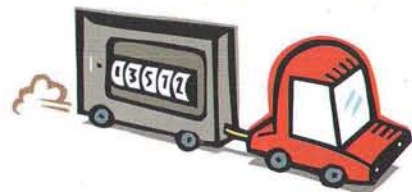
Using Informed, your Newton data seamlessly fills in electronic forms, right on your desktop computer. From expense, order or survey forms to those specialty forms unique to your business — whether it's insurance, health care...or flying lessons!

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Taking forms from the desk to the desktop... and beyond.

Circle 37 on reader service card



MILEAGE TRACKER If you use your car for business, you probably hate scribbling mileage and other travel-related costs onto scraps of paper. MPG, a \$30 package from Catamount software makes the task a one-stop shop that you can keep on your dashboard, on the seat, or in your glove box. You can use the software to track vehicle costs, fuel, maintenance schedules, and business trip mileage for one or many vehicles.

MPG: Catamount Software, 802/863-5256

DETAILS, DETAILS Filling out reports to bill clients for your time and expenses is unquestionably un-fun. With Time-Reporter 3.0, Iambic Software's \$100

Keep track of your expenses and time yourself to the minute with TimeReporter 3.0.

integrated time and expense tracking, reporting, and billing application, you can keep track of your time and business expenses on the go. With links to Newton's Names, To-do, Calendar, and call entries, the package even includes a stopwatch so you can bill down to the minute.

TimeReporter 3.0: Iambic Software, 800/730-5370

Just for Fun

Ready for a break? Try these seriously fun applications for your portable pal: Gold Tee at Bighorn (around \$35), a golf game that you can play with up to four people (Apple Computer, 800/708-7827); MusicPad, a \$40 music-composition app that plays back your songs from the PDA speaker (Landware, 800/526-3977); and Pocket Chef, a \$100 mobile meal-planning tool that lets you create a grocery-shopping list by aisle (Forest Software, 970/923-3572).

Easter Egg Hunt



Tap your way to the mysterious and funny surprises hidden in Newton 2.0.

BY MARIE D'AMICO

Editor's note: *All work and no play makes anyone dull. Apple's Newton team had fun working on the new operating system, even plugging in a few hidden surprises. Freelance writer Marie D'Amico prevailed on her husband, Apple Fellow and Chief Programmer Steve Capps, to show her where all the so-called Easter Eggs lie in Newton 2.0. An Easter Egg is a hidden sound or picture placed in code by a programmer with a wacky sense of humor. Here's D'Amico's list for some of the tastiest Eggs in Newton 2.0. Enjoy.*



EGG FRECKLES Around the time that comic-strip artist Garry Trudeau made fun of the original Newton in Doonesbury, reporters often asked me, "how does your husband feel about his invention being ridiculed in Doonesbury?" To show what good sports we were, I wrote to Trudeau asking for an autographed

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- Dr. Mark Ebell, *The Journal of Family Practice*



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- Fax or print notes/scripts directly from the Newton

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- Reduce/Eliminate dictation
- Speed encounter flow
- Reduce improper and non specific billing

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- Improve continuity of care with on-the-spot past medical data
- Care plans and health maintenance guidelines are listed and included in the note by simply tapping

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print of the complete strip for Capps's birthday. Trudeau sent me not only the signed strip but also an explanation of its creation. "I know a lot of people took my Newton strips to be a full-blown consumer review pan, but I was just writing about guys and their toys." He added, "The only thing I don't own is a Newton. I've never even laid eyes on one." To show what a good sport *he* was, Trudeau even drew a special Easter Egg for new 2.0. You can find Trudeau's Egg in 2.0 by writing "egg freckles" and tapping the "Assist" button.



GEOGRAPHY LESSON

Feel like going on a wild world tour? Fun cities on the Newton 2.0 world map (tap Extras, tap Time Zones) include "Titanic," "Newton-

more," and "Newton, Iowa," the home of Maytag.



THE X-FILES If you believe in UFOs, the Bermuda Triangle, and the X-Files, you'll love this one. Area 51, AKA Groom Lake, is a top-secret military installation that

lies about 90 miles north of Las Vegas, Nevada. Area 51 is where the government tests spy planes like the U-2 and the Stealth bomber (legend has it that Area 51 is also home to captured aliens from distant planets). Newton programmers placed their own Top Secret Area 51 Easter Egg in 2.0, to the displeasure of the CIA. And though Apple disavows any knowledge, you can find the Area 51 Easter Egg in Newton 2.0 by following these steps: Tap Extras, tap Unfiled Icons folder tab, choose

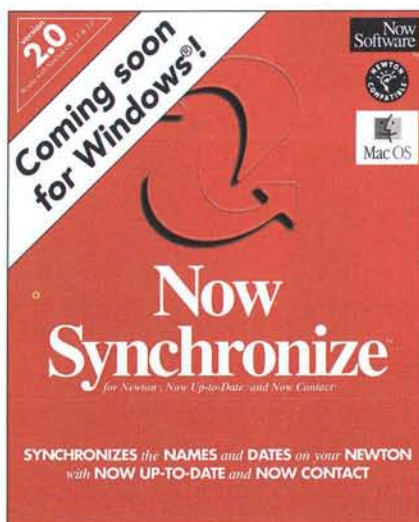
Storage, tap Time Zones, tap Delete, tap OK, tap Storage folder tab, choose Unfiled Icons, tap Time Zones, tap on map near Nevada, and Area 51, NV will appear in the list of cities. ET and UFO icons appear in the Calendar. (For more mysteries, check out the following Web site: http://www.cris.com/~psyspy/area51/desert_rat.)

CUCKOO NAMES If you want to go cuckoo, tap Dates, tap i, tap Prefs, tap in any corner without the X.

KNOCK THREE TIMES Write any of the following three times and you'll get a surprise: larryy, Brandyn, lesv, stafford, lyon.

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Consumer Advocate

by Howard Baldwin

Divining the Difference between Performas and Power Macs

SUBTLE CHOICES MEAN CAREFUL DECISION-MAKING

IF YOU'RE CONFUSED ABOUT the difference between a Performa and a Power Macintosh—and the letters we receive indicate that you are—simply think of them as the descendants of the Apple II and the Lisa, respectively. Apple Computer has always believed that its home machines (Performas) don't go into offices, and its office machines (Power Macintoshes) don't go into homes. In fact, according to Apple, 97 percent of Performas go straight home from the store.

But which one should you buy? They both run System 7.5 operating system software. Both come with RISC processors, and soon both will offer PCI slots. Except for the Performa 5000 series, which is an integrated one-piece box, you can upgrade the monitors of both. You can also upgrade the motherboards of both to take advantage of processor improvement.

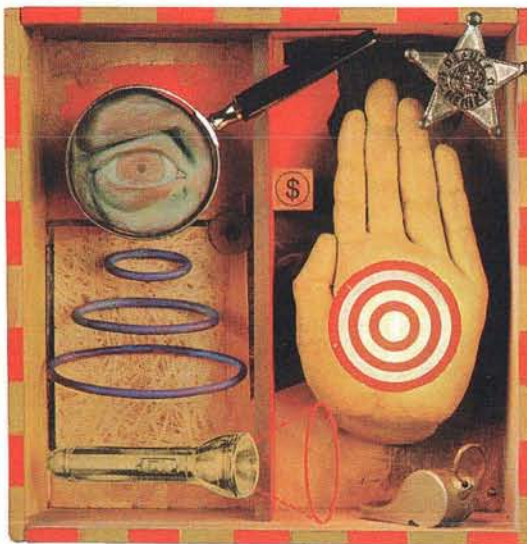
Wait, now we're confused too. Let's go through the pros and cons of each and get this straightened out.

Performa Pros and Cons

The man who's in charge of Apple's entry Macintosh product line, Bruce Gee, calls the Performa the "Club Med of computers." Just like the vacation destinations where food and fun are included, on a Performa the software applications you need to get started are already installed. You'll find Claris's ClarisWorks integrated-office package, Apple's At Ease security software, Intuit's Quicken check-writing software, Datawatch's Virex antivirus software, and ten other applications, along with nine CDs. The modem's built in, so you can plug in the phone jack and start your online surfing. It's the cheapest desktop RISC processor you'll find.

Sound great? Sure it does. You've saved the cost of the monitor (about \$500) and the software (about \$1500). There are just a couple of problems. If you ever want a

bigger monitor, you can go ahead and buy one—but unless you donate your old one to a local charity or school, that monitor is probably going to gather dust because you won't find much use or market for it. The software you get? Well, the \$1500 figure refers to the suggested retail price of the software, but as we all know, nobody buys anything at the SRP. What's more, you may not even get the latest versions. The fact is, the computer you buy today may have been manufactured before an included software application was upgraded—you'll have to shell out more money if you want the latest version.



And once you've upgraded to the new version, since newer software is generally bigger, not smaller, you may soon find the computer choking on the 8MB or 16MB of RAM that ships with the Performa. System 7.5 takes 5MB of RAM. ClarisWorks may take only 3MB of RAM to run, but if you upgrade to Microsoft Word 6.0 (6MB of RAM) and Microsoft Excel 5.0 (10MB), you'll have to upgrade your RAM as well to run two similarly memory-heavy programs. You can expand the Performas to 64MB of RAM, but to do so requires two 32MB

SIMMs, and the Performas have only two SIMM slots. That means jettisoning the 8MB or 16MB SIMM (although some stores will buy them back). Gee's recommendation either when you buy your Performa or when you upgrade: buy one 32MB SIMM and go with 40MB of RAM total. Unfortunately, this costs about \$1600 (almost as much as the Performa itself), excluding installation, which is another \$50 to \$75.

On other upgradability fronts, there's mixed news. Performa hard drives range from 500MB to 1GB in the standard IDE format common in PCs, so you can increase disk capacity easily. But over the next year, IDE will be superseded by a standard called Enhanced IDE. It's unclear what you will need to upgrade today's Performas to accommodate an internal E-IDE drive (PCs need an upgraded BIOS), but you can always add external SCSI storage. You can buy your Performa with either a 14.4-Kbps or 28.8-Kbps internal modem, and for Web browsing you really need the latter. It isn't yet possible to swap the modem for a faster version—you'll have to use an external modem. You can add video and communications cards, but these are Performa-specific and cost between \$100 and \$200.

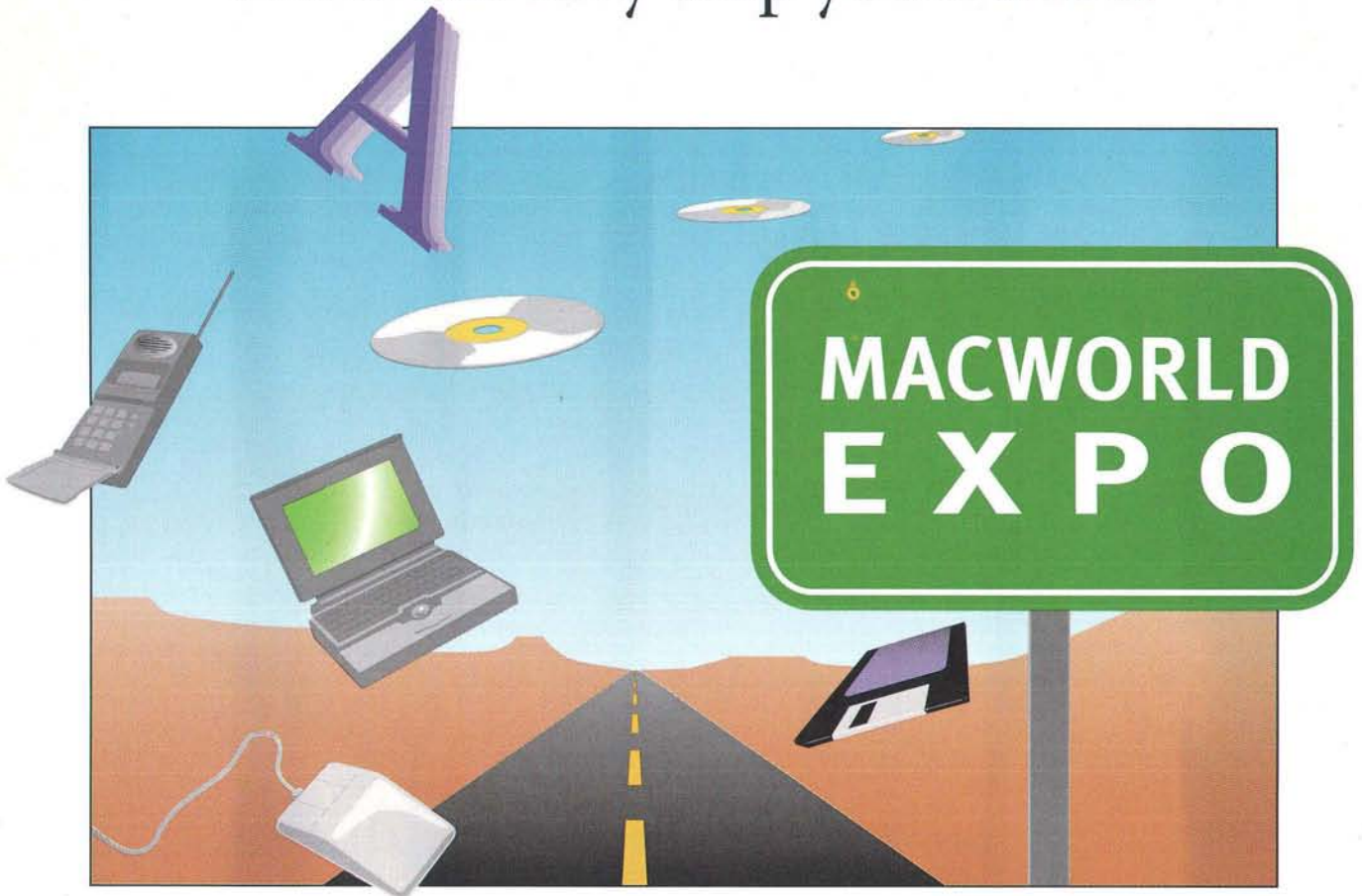
Power Mac Positives and Negatives

This brings us to the Power Macs. The first thing you'll notice is the price tag—Apple's suggested price for Performas starts at around \$1400, while Power Macs start at around \$1500 for a 7200/75 (the two lines overlap in the \$1549 to \$2800 price range). Extending Apple's travel analogy, the Power Mac is for people who like to plan their own itinerary—like

continues

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backpackers headed to Nepal with a stopover in Vietnam. Power Macintoshes come in 17 versions, and you can mix and match hard drives, monitors, and RAM to configure whatever you want. With the 9500 towers, you can even add new internal disk drives, rather than adding to the chain of SCSI storage devices. Want to network? Ethernet ports are built into Power Macs—not so with the Performas.

But without software built in, you're looking at an additional cost for applications (unless you go to a retailer who will throw in some application disks). At \$425 for Microsoft Office, \$90 for Claris FileMaker Pro, a couple of utilities at \$80 each, and \$40 each for some CDs, you've paid half again as much as the Power Mac for software. And Power Mac buyers aren't immune to RAM choking either. Power Macs may come with 16MB, but you'll need to add at least 8MB, and maybe even 16MB, for a basic office computer. Anybody using Adobe Photoshop needs at least 40MB. There's another \$1200.

The Last Word

The answer to the Performa versus Power Mac question isn't clear-cut. To the question, "What should I buy?" we in technology usually respond, "What are you going to use it for?" But there's another important angle—what are you going to use it for in three years? In most technology purchases, whether corporate or personal, there's a tendency to ponder the neat stuff you can do that you hadn't thought of before.

As a result, no matter what computer you buy, in three years it may not have the

THE AMCoEX INDEX OF USED MACINTOSH PRICES

Machine (RAM/Hard Drive)	Average Sale Price	Monthly Change
PowerBook 140 (4MB/40MB)	\$625	+\$25
PowerBook 165 (4MB/80MB)	\$900	\$0
PowerBook 180 (4MB/80MB)	\$1250	\$0
PowerBook Duo 230 (4MB/80MB)	\$750	-\$50
Mac IIsi (5MB/40MB)	\$225	\$0
Mac IIci (4MB/80MB)	\$400	+\$50
Mac IIfx (4MB/80MB)	\$375	\$25
Centris 650 (8MB/230MB)	\$875	-\$75
Quadra 800 (8MB/230MB)	\$1125	\$0
Quadra 900 (8MB/160MB)	\$975	-\$125
Power Mac 7100/66 (8MB/350MB)	\$1475	+\$25
Power Mac 8100AV (8MB/500MB)	\$2175	-\$75

Index provided by the American Computer Exchange of Atlanta (800/786-0717). It reflects sales during the week of January 5, 1996. Configurations include keyboard and exclude monitor and display board for noncompact models.

processor power, the CD-ROM speed, or the hard drive capacity to run the latest and greatest applications. And even if you can upgrade it, the cost may set you back as much as a new computer would—whether Performa or Power Mac.

So are you willing to bite the bullet and buy a new computer in three years (or sooner)? Is there someone in the family or the company to whom you can pass the old one? If so, great. But if you're one of those rare and lucky souls who are confident that their computing needs will remain constant long past the turn of the century, then open up the all-in-one Performa box. Until technology stabilizes, the rest of us should stick with the power and flexibility that the Power Mac promises.

Whatever Happened to . . . ?

Missing in Action In November 1995, I had trouble with my Spirit Technologies hard drive. After getting a return-merchandise authorization number from the company's tech-support department, I sent the drive to Spirit via Federal Express. Yesterday, my hard drive was returned unopened with a form letter that states, "Spirit Technologies will no longer be in a position to assist you in repair of hardware products."

Since then, I've E-mailed, faxed, and left bunches of voice messages, but I've gotten no response of any kind. Do you know if the company is going out of business?

DAVID M. PECK, SR.

Rosemount, Minnesota

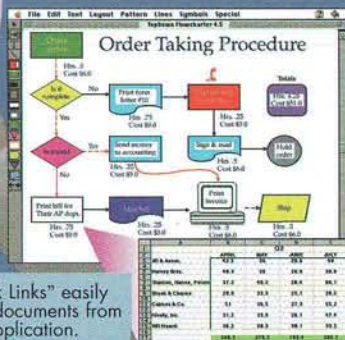
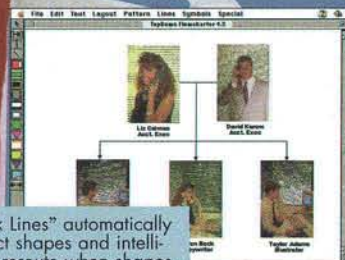
continues

Performa versus Power Mac

	Performa	Power Mac
Starting price	\$1400	\$1549
RISC processors	yes	yes
Bundled software	System 7.5, ClarisWorks, 13 other applications	System 7.5
Add-in cards	currently Performa-specific	PCI
Ethernet	optional	built-in

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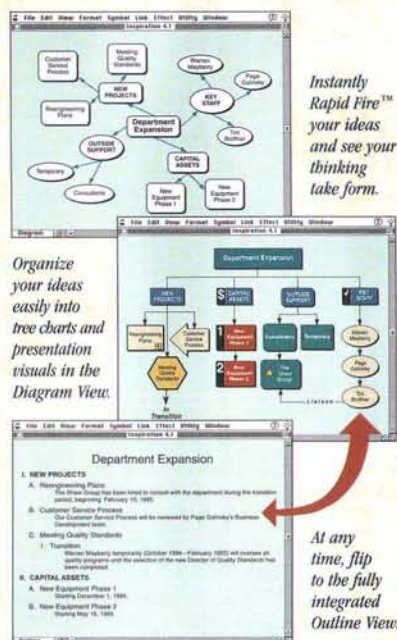
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CONSUMER ADVOCATE

Bugs and Turkeys



Softkey's (800/227-5609) American Heritage Dictionary 3.0 crashes if installed on a Mac with more than 16MB of RAM. To fix, upgrade to 3.6.1—ask for the special "memory issue" price of \$12.95; otherwise, it's \$29.95.



Unlike the PC version of Netscape Navigator 2.0, the Mac version does not support Java, and won't until version 2.1. Netscape Communications (415/528-2555, info@netscape.com) says it has had a hard time finding experienced Mac programmers.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

When I called Spirit Technologies in late December, I couldn't reach anyone—this was not an entirely surprising outcome, considering that it was the holiday week.

However, according to the recording on Spirit's main number in a post-New Year's follow-up call, Spirit Technologies is no longer in business. Callers with customer-service-related issues are referred to LB Technologies (510/656-3791); all other business-related questions should be directed to Lisa Donabue of The Recovery Group (617/482-4242, fax 617/482-9804). Spirit Technologies' direct-sales division, Spin Peripherals, is now part of MacMall, according to a Spin Peripherals phone recording. Users with Spin drives or with questions regarding Spin products should call MacMall at 800/222-2808.

Leo Berengual, president of LB Technologies, says the company will repair Spirit products as Spirit's taped message states, but that it "charges a fee for processing"—anywhere from \$19 to \$79 for in-warranty repairs. For out-of-warranty repairs, the company charges a flat \$69 diagnostic fee, plus repair costs. Berengual also warns that if the warranty on a defective part is rejected by the manufacturer, LB Technologies charges for the repair as it would an out-of-warranty product. Prices are subject to change, so users should call for a quote before sending in equipment for repair.

Macworld's Conspicuous Consumer col-

umn of September 1994 offered suggestions for dealing with companies that are no longer in business. If you use a credit card to pay for merchandise you never received, dispute the charges with the credit card company. And stay abreast of the latest news—if a company actually files for bankruptcy, file a claim as soon as possible with the bankruptcy court in the area in which the company is located (the court clerk's office can send the form). Filing a claim doesn't guarantee you will be reimbursed any money the company owes you, but at least you will be in line with the other creditors.

When Macworld went to press, the Massachusetts Bankruptcy Court (617/565-8950) had no listing for Spirit Technologies.

—SUZANNE COURTEAU

When Macworld senior editor HOWARD BALDWIN asked his niece, a Performa owner, what she wanted for her birthday, she replied, "More RAM."

Not getting the treatment you deserve? Or have you received heroic service? Write to the Consumer Advocate department at Macworld, 501 Second St., San Francisco, CA 94107, or send us a fax at 415/442-0766. **m**

Service HERO

Contributing editor David Pogue's lousy Friday got worse when his PowerBook Duo fell off the table and struck the floor. Parts and components sprayed everywhere: a battery here, a trackball there, a back-panel flap over by the sink.

In a panic, he put the parts into a sandwich bag and took them, with the dismembered laptop, to Tekserve (212/929-3645), a New York City Mac-service and -repair shop. The technician, barely concealing his amusement at the sight of the sandwich bag, reseated each component, wiggled the case back into alignment, tightened the screw, and handed the whole thing back to Pogue.

"There you go. No charge," he said.

"Wow," said David, "don't I owe you something?"

"Look, if I brought you a broken radio, and all it needed was for you to bend the antenna back into alignment, would you charge me?"

"I guess not," Pogue said.

Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld Star Ratings lets you compare Macintosh products based on the authoritative assessments in our reviews and features. The number of stars indicates the product's level of quality; each product also gets a numeric score that provides a more exact assessment of the product's quality within that level. We evaluate seven factors to derive the Star Rating: feature set, design implementation, performance, reliability, ease of use, innovation, and value. We take these evaluations, weight their importance for each class of product, and calculate the final score. The higher the score, the better a product is, even among products with the same number of stars. The following list shows how the ratings and scores relate.

★★★★★	9.0 to 10.0	Outstanding
★★★★	7.0 to 8.9	Very Good
★★★	5.0 to 6.9	Good
★★	3.0 to 4.9	Flawed
★	0.0 to 2.9	Unacceptable

This section also lists products that have been awarded an **Editors' Choice** designation in a *Macworld* product comparison.

If a product has been upgraded since our last assessment, the most recent version number appears in parentheses after the main reviewed version number. To read a full review of any product in the listing, please consult the issue indicated at the end of the listing or search for the product via *Macworld Online* (keyword *Macworld* on America Online; URL <http://www.macworld.com> on the World Wide Web).

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

software

BUSINESS TOOLS

- ★★★★/8.8 **4th Dimension 3.5**, ACI US, 408/252-4444, \$895. Leading Mac database gets important improvements. *Mar 96, p. 60*
- ★★ **Adobe Acrobat 2.0 (2.1)**, Adobe Systems, 415/961-4400, \$195. The font fidelity of this portable-document software is uneven. *Mar 95, p. 59*
- ★★★ **Adobe Acrobat for Workgroups 2.0 (2.1)**, Adobe Systems, 415/961-4400, \$1595. Portable-document software for workgroups is inexpensive but resource-intensive. *Mar 95, p. 59*
- ★★★★ **ArcView 2.1**, Environmental Systems Research Institute, 909/793-2853, ext. 2050, \$995. Sophisticated GIS program is easy to customize.

Jan 96, p. 55

- ★★★★ **BizPlan Builder 5.0**, Jian, 415/254-5600, \$129. Easy-to-use spreadsheet/word processor template creates business plans. *Jun 95, p. 61*
- ★★★ **Business Plan Writer 6.0**, Graphite Software, 301/984-1100, \$99. Proposal-writing template helps you create a detailed business plan. *Jun 95, p. 61*
- ★★★★/9.7 **Data Desk 5.0**, Data Description, 607/257-1000, \$625. Classic statistics program adds dazzling new features. *Mar 96, p. 79*
- ★★★★ **DeltaGraph Pro 3.5**, DeltaPoint, 408/648-4000, \$195. Easy-to-use graphing software stands out from the pack. *Jan 96, p. 57*
- ★★ **Equate 1.0**, Holosoft, 408/748-9648, \$99. Newton spreadsheet is compatible with Excel. *Oct 95, p. 85*
- ★★★★ **Helix Express 3.03**, Helix Technologies, 708/465-0242, \$589. Latest release of visually oriented database adds speed and features. *Sep 95, p. 65*
- ★★★★ **MapInfo 3.0**, MapInfo, 518/285-6000, \$1295. Mapping software includes advanced geographic-analysis and geocoding tools. *Oct 95, p. 66*
- ★★★ **Meeting Maker XP 3.1**, On Technology, 617/374-1400, \$249; \$890 for 10 users. Group scheduling program is useful for small and midsize businesses. *Jan 96, p. 69*
- ★★★★ **Microsoft Excel 5.0**, Microsoft, 206/882-8080, \$339. A wealth of powerful features but huge hardware requirements. *Jan 95, p. 54*
- ★★★★ **Microsoft FoxPro for Macintosh 2.5 (2.6)**, Microsoft, 206/882-8080, \$495. The relational database offers fast searching but an uneven interface for users. *Apr 94, p. 56*
- ★★★ **PhoneDisc 95 PowerFinder**, Digital Directory Assistance, 617/639-2900, \$249. CD-ROM-based phone directory is convenient, but must be updated periodically. *Oct 95, p. 91*
- ★★★ **Phyla 1.0.3**, Mainstay, 805/484-9400, \$495. While nonprogrammers can learn to use this object-oriented database, a little SmallTalk or C++ programming background wouldn't hurt. *Aug 95*
- ★★★ **QuickFigure Pro 2.1**, PelicanWare, 503/221-1148, \$49.95. Newton spreadsheet includes charting and linear equation solving. *Oct 95, p. 85*

COMMUNICATIONS/NETWORKS

- ★★★★ **Apple Mobile Message System**, Apple Computer, 408/996-1010, \$549; \$19.95 per month. Multifaceted remote-messaging service helps you keep in touch. *Sep 95, p. 74*

- ★★★★ **ASAP 1.5**, MicroBeam, 813/546-2727, \$695; \$795 with Windows client program. Convenient utility makes file-transfer operations quick and easy. *Sep 95, p. 72*
- ★★★ **Claris EMailer 1.0**, Claris, 408/727-8227, \$89. E-mail-management program offers impressive features at a good price. *Dec 95, p. 62*
- ★★/4.6 **COPSTalk for Windows 1.2f**, CoOperative Printing Solutions, 770/840-0810, \$179 per user. Windows 95-compatible software gives PCs AppleTalk capability. *Mar 96, p. 67*
- ★★★ **CreativePartner**, emotion Inc., 415/812-9000, \$1500. Collaboration tool distributes video, sound, text, and graphics over a network. *Jul 95, p. 69*
- ★★/4.9 **CyberFinder 2.0**, Aladdin Systems, 408/761-6200, \$30. Software uses the Finder to track Internet URLs. *Mar 95, p. 82*
- ★★★★ **FileWave 2.1.2**, Wave Research, 510/704-3900, \$895. Update LAN users with this easy-to-use software-distribution tool. *Jul 95, p. 63*
- ★★★ **GrabNet 1.0**, ForeFront Group, 713/961-1101, \$19.95. Simple, affordable utility captures Web pages. *Nov 95, p. 85*
- ★★ **HoloGate 1.0**, Information Access Technologies, 510/704-0160, \$500. E-mail gateway is price-rich and feature-poor. *Apr 95, p. 71*
- ★★★★ **MacAdministrator**, HI Resolution, 508/463-6956, \$395 (10-user pack). Group administration tool is a great helper for network administrators. *Dec 95, p. 75*
- ★★★★ **Netscape Navigator**, Netscape Communications, 415/528-2555, \$39. Web browser is ahead of the pack in terms of features and ease of use. *May 95, p. 69*. **Editors' Choice** for best Internet browser. *Oct 95, p. 110*
- ★★★★ **NetWorks 3.0.4**, Caravelle Networks, 613/225-1172, \$1395 to \$2495. Network-monitoring utility is an indispensable tool. *Apr 95, p. 85*
- ★★/6.9 **PageMill 1.0**, Adobe Systems, 415/961-4400, \$149. Drag-and-drop Web publishing software masks HTML complexities. *Mar 96, p. 56*
- ★★★★/8.8 **PageNow 1.5**, Mark/Space Softworks, 408/293-7299, \$119. Alphanumeric paging software gets the message across. *Mar 96, p. 70*
- ★★★/5.8 **Personal MacLAN Connect 5.51**, Miramar Systems, 805/966-2432, \$199 per user. Windows 95-compatible software lets PC and Mac users communicate via AppleTalk. *Mar 96, p. 67*
- ★★★★ **ProTerm Mac 1.0**, InTrec Software, 602/992-5515, \$129.95. Communications program is fast, reliable, and stable. *Jul 95, p. 71*
- ★★★ **QuickMail 3.0 (3.5)**, CE Software, 515/221-continues

Star Ratings

1801, \$199 to \$3799. Good choice for most people, although rule-based features are incomplete. Jan 95, p. 59

★★★ **Saber LAN Workstation**, Saber Software, 214/361-8086, \$199 plus \$49 per node. LAN-management package is a useful tool for the price. Aug 95, p. 73

★★★★ **Skyline/Satellite**, AG Group, 510/937-7900, 1-station pack \$795; 5-station pack \$1195; 10-station pack \$1995. Remote monitoring engines keep an eye on LAN traffic. Sep 95, p. 74

★★★★ **SnapMail 2**, Casady & Greene, 408/484-9228, \$250 (5 users); \$420 (10 users); \$1940 (50 users). E-mail software is easy to install, but its gateway interface is kludgy. Dec 95, p. 75

★★★★ **Snatcher 1.0**, Software Ventures, 510/644-3232, \$49.95. Simple, efficient FTP tool lets you connect to multiple sites simultaneously. Aug 95, p. 81

★★ **TurboTalk 1.0**, Information Presentation Technologies, 805/541-3000, \$160 to \$495. Network utility's performance is unimpressive on some network configurations. Oct 95, p. 83

DESKTOP PUBLISHING

★★★★ **Adobe PageMaker 6.0**, Adobe Systems, 206/622-5500, \$895. Page-layout program's upgrade includes practical and powerful improvements. Nov 95, p. 60

★★★ **ColorDrive 1.0**, Pantone, 201/935-5500, \$199. Color-management software supports a broad range of color models. Nov 95, p. 70

★★★★ **FrameMaker 5.0**, Adobe Systems, 408/975-6000, \$895. Page-layout program is a good choice for technical-document creation. Nov 95, p. 63

★ **HoTMetal Pro 2.0**, SoftQuad, 416/239-4801, \$195. Web authoring software is hampered by a poorly designed interface. Jan 96, p. 65

★★★★ **Icfields 2.3**, The Color Partnership, 619/259-8688, \$895. Professional printers will appreciate this stochastic-screening software. Nov 95, p. 75

★★★★ **QuarkXPress 3.2 (3.31)**, Quark, 303/894-8888, \$895 (\$995 for Power Macintosh). A must-have layout tool for color publishers. Nov 93, p. 51

★★★★ **theTypeBook 4.0**, Rascal Software, 805/255-6823, \$59.95. Customizable type-specimen generator is a worthwhile purchase. Jun 95, p. 73

EDUCATION/ENTERTAINMENT

★★★★ **3D Atlas 1.1**, EA World, 415/571-7171, \$79.95. Well-designed atlas enriches map data with narration, photos, and movies. May 95, p. 73

★★★ **AmoebArena 1.0**, Casady & Greene, 408/484-9228, \$49.95. Engaging strategy game pits amoeboid against amoeboid. Jan 96, p. 75

★★★ **CyberBoogie**, Times Mirror Multimedia, 314/531-2503, \$49.95. Cute animation software is a good choice for very young kids. Apr 95, p. 89

★★★★ **The Daedalus Encounter**, Virgin Interactive Entertainment, 714/833-8710, \$59.95. Escape from a doomed spacecraft in this interactive adventure. Sep 95, p. 73

★★★★ **Digital Chisel 1.2**, Pierian Spring Software, 503/222-2044, \$199.95, site license \$995. Authoring tool creates good interactive quizzes but suffers

from a nonstandard interface. Jun 95, p. 71

★★★ **FrenchNow 3.0**, Transparent Language, 603/465-2230, \$99 to \$129. While it doesn't replace a class, software can help you learn French. Dec 95, p. 83

★★★★ **Full Throttle**, LucasArts, 415/472-3400, \$49.95. Biker adventure game is witty and action-packed. Jan 96, p. 73

★★ **Haight-Ashbury in the Sixties**, Compton's NewMedia, 619/939-2500, \$49.95. If you can remember the sixties, you probably don't need this CD-ROM. Dec 95, p. 84

★★★ **King's Quest VII: The Princeless Bride**, Sierra Online, 206/649-9800, \$59.95. Adventure game is entertaining, but adults might find its plot silly. Jan 96, p. 75

★★★ **The Legend of Kyrandia, Book 3**, Virgin Interactive Entertainment, 714/833-1999, \$34.95. Enjoyable adventure game features good graphics and sound. Jan 96, p. 77

★★★★ **Links Pro CD**, Access Software, 801/359-2900, \$69.95. An excellent simulation of golf's many challenges. Jan 96, p. 73

★★★★ **The Lost Mind of Dr. Brain**, Sierra Online, 206/649-9800, \$44.95. Hilarious brainteasers are presented in an imaginative, arcade style. Oct 95, p. 93

★★★★/8.5 **Marathon 2: Durandal**, Bungie Software Products, 312/563-6200, \$79. A well-crafted action-adventure game, but it's not for the squeamish or those disturbed by violence. Mar 96, p. 85

★★★★ **Material World**, StarPress Multimedia, 415/274-8383, \$59.95. Multimedia CD-ROM provides a fascinating look at diverse cultures. Jun 95, p. 83

★★★★ **Math Workshop**, Brøderbund Software, 415/382-4700, \$40. Youngsters can have some fun while learning math. Aug 95, p. 89

★★ **Merriam-Webster's Collegiate Dictionary on CD-ROM**, Merriam-Webster, 413/734-3134, \$69.95. Powerful search capabilities don't make up for this dictionary's interface flaws. Nov 95, p. 79

★★★★ **Nile: Passage to Egypt**, Discovery Channel Multimedia, 301/986-1999, \$49.95. Armchair adventurers will enjoy this multimedia journey on CD-ROM. Oct 95, p. 93

★★★ **Out of the Sun**, Domark software, 415/513-8929, \$44.95. Flight-simulation game presents historic or custom battle scenarios. Jan 96, p. 77

★★★★ **Passage to Vietnam**, Against All Odds Productions/Interval, 800/558-3388, dept. 100, \$39.95 to \$59.95. Stunning photojournalism CD-ROM sets a new standard for multimedia projects. Dec 95, p. 83

★★★ **Small Blue Planet 2.0 (2.0.1)**, Now What? Software, 415/885-1689, \$59.95. The satellite photos of this atlas are truly dazzling, although the interface is less than world class. May 95, p. 73

★★★★ **Storybook Weaver Deluxe 1.0**, MECC, 612/569-1500, \$69.95. Well-designed program lets kids create their own storybooks. May 95, p. 83

★★★★ **Theorist 2.0**, Waterloo Maple Software, 519/747-2373, \$299. Symbolic-math program is a great learning aid for students. Jun 95, p. 79

★★★★ **Widget Workshop**, Maxis Software, 510/254-9700, \$44.95. Clever mad scientist's laboratory encourages imagination and exploration. Apr 95, p. 89

★★★★/8.9 **You Don't Know Jack**, Berkeley Systems, 510/540-5535, \$30. "Jeopardy!" with a bad attitude. Mar 96, p. 85

FINANCE/ACCOUNTING

★★★★ **Managing Your Money 7.0**, MECA Software, 203/255-1441, \$79.95. Personal financial software includes advanced investment features. Oct 95, p. 81

★★★★ **M.Y.O.B. 5.0**, BestWare, 201/586-2200, \$139 (\$239 with payroll). Well-designed interface makes double-entry accounting easy. May 95, p. 63

★★★ **QuickBooks 3.0**, Intuit, 415/322-0573, \$119. Double-entry accounting program is easy to use but not entirely Mac-like. Jun 95, p. 58

★★★★/8.3 **Quicken Deluxe 6**, Intuit, 520/295-3220, \$59.99. The best-selling package gets bigger and mostly better. Feb 96, p. 65

GRAPHICS

★★★ **AddDepth 2.0**, Ray Dream, 415/960-0768, \$99. Three-dimensional effects software provides a simple way to give depth to illustrations. Nov 95, p. 81

★★★★/8.4 **Adobe After Effects 3.0**, Adobe Systems, 415/961-4400, \$995 base version; \$1995 Production Bundle. Must-have video-design package enhances motion control and adds effects. Mar 96, p. 54

★★★★ **Adobe Dimensions 2.0**, Adobe Systems, 415/961-4400, \$199. 3-D effects software has added color support plus drawing and text tools. Apr 95, p. 71

★★★★ **Adobe Photoshop 3.0 (3.0.4)**, Adobe Systems, 415/961-4400, \$895. Broader capabilities combine with simplified work environment. Jan 95, p. 52. **Editors' Choice** for best image editor. Feb 95, p. 112

★★★★/7.4 **Adobe Premiere 4.2**, Adobe Systems, 415/961-4400, \$795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. Mar 96, p. 90

★★★ **Adobe TextureMaker 1.0 (2.0)**, Adobe Systems, 415/961-4400, \$199. Texture generator creates backgrounds for multimedia or printed projects. Oct 95, p. 89

★★★ **Alien Skin Textureshop 1.0**, Virtus, 919/467-9700, \$99. Apply random mutations to master textures to create custom patterns. Jul 95, p. 81

★★★ **Black Box 2.0**, Alien Skin Software, 919/832-4124, \$119. Photoshop image filters are useful and worth their modest price. Nov 95, p. 87

★★★★/6.9 **Boris Effects 1.01**, Artel Software, 617/566-0870, Premiere version \$350; Media 100 version \$695. Plug-in for Premiere and Media 100 adds video-effects control. Feb 96, p. 85

★★★ **Canvas 3.5 (3.5.2)**, Deneba Software, 305/596-5644, \$399. Lots of features but confusing interface. Jan 94, p. 49

★★★ **CD-Q 2.0**, Human Software Company, 408/741-5101, \$145. Photoshop plug-in facilitates color corrections and separations on Photo CDs. Jul 95, p. 65

★/1.5 **Chagall 2.0.2**, Technosystems USA, 502/351-0108, \$299. Image-editing application flunks test. Feb 96, p. 78

★★★★/8.0 **Claris Impact 2.0**, Claris, 408/987-7000, \$99. Easy and affordable business-graphics software. Feb 96, p. 66

★★★★ **Color It 3.0**, MicroFrontier, 515/270-8109, \$149.95. Venerable paint program has been updated with powerful new features. Aug 95, p. 75

★★★ **Colorize 2.0**, DS Design, 919/319-1770, \$495. Colorizing software is effective, but expensive for

a one-trick pony. *Dec 95, p. 81*

★★★★★/7.5 **Dabbler 2**, Fractal Design, 408/688-5300, \$69. Drawing package offers an easy, affordable natural-painting option. *Mar 96, p. 63*

★★★★★/7.3 **DrawTools 1.0**, Extensis, 503/274-2020, \$149. Extensions add color, shape, and object tools to FreeHand and Illustrator. *Feb 96, p. 71*

★★★/4.5 **Envelopes 1.0**, Letraset USA, 800/343-8973, \$99. Distorts objects but inserts extraneous anchor points as well. *Mar 96, p. 106*

★★★ **FloorPlan Plus 1.1**, ComputerEasy International, 602/829-9614, \$49.95. Affordable 2-D CAD program is intended for rudimentary design tasks. *Sep 95, p. 85*

★★★ **FullPixelSearch 1.5**, Avian Systems, 201/224-2025, \$1295. Analyze scientific images with a variety of pixel-selection functions. *Jul 95, p. 79*

★★★ **Gryphon Batch It 1.0**, Gryphon Software, 619/536-8815, \$199. Although it lacks conditional statements, batch processor is a time-saver. *Jun 95, p. 67*

★★★★ **Infini-D 3.0**, Specular International, 413/253-3100, \$899. 3-D software does professional-quality rendering and animation. *Jan 96, p. 54*

★★★/3.3 **Infinite FX 1.0**, Belinfinit, 404/552-6624, \$149. Many automated reshaping effects, mired by poor organization. *Mar 96, p. 106*

★★★ **IntelliHance 1.0**, DPA Software, 214/517-6876, \$129 to \$299. Photoshop plug-in automates the process of improving scanned graphics. *Sep 95, p. 71*

★★★★★/8.3 **Kai's Power Tools 3.0**, MetaTools, 805/566-6200, \$199. More-powerful plug-ins, more-baffling interface. *Feb 96, p. 57*

★★★★ **KPT Convolver 1.0**, MetaTools, 805/566-6200, \$199. Imaginative and absorbing plug-in module creates Photoshop filters. *Aug 95, p. 71*

★★★★★/8.5 **KPT Vector Effects 1.0**, MetaTools, 805/566-6200, \$199. Combines excellent experimentation functions with thoughtful interface design. *Mar 96, p. 106* **Editors' Choice** for best natural-draw program.

★★★★★/6.2 **LightningDraw GX 1.0**, Lari Software, 919/968-0701, \$299. Lets you combine colors and shapes and experiment with QuickDraw GX fonts. *Mar 96, p. 106*

★★★★ **Live Picture 2.0**, HSC Software, 805/566-6200, \$995. Latest version of this innovative image editor boasts many improvements. *Sep 95, p. 62*

★★★★ **MacPhase 2.0**, The Otter Solution, 315/768-3956, \$279. Feature-rich program offers scientific and graphics image processing tools. *Aug 95, p. 85*

★★★★★/8.1 **Macromedia FreeHand 5.5**, Macromedia, 415/252-2000, \$595. Draw program outperforms competitor, for now. *Feb 96, p. 74*

★★★★★/8.1 **MiniCad 6**, Graphsoft, 410/290-5114, \$795. Nothing's small about this modular package. *Mar 96, p. 65*

★★★ **MovieFlo' 1.1**, The Valis Group, 415/435-5404, \$899. Tug, twist, and pinch images with this special-effects program. *Jun 95, p. 60*

★★★★ **Paint Alchemy 2.0**, Xaos Tools, 415/487-7000, \$199. Flexible image editor is an appealing add-on for digital artists. *Sep 95, p. 70*

★★★★★/9.4 **Painter 4**, Fractal Design, 408/688-5300, \$549. Near-perfect painting program just got even better. *Mar 96, p. 58*

★★★★ **PhotoEnhancer 1.0**, PictureWorks, 510/855-2001, \$129. Nifty utility improves the quality of QuickTake photos. *Apr 95, p. 65*

★★★★ **PhotoFix 2.8.8**, Microspot USA, 408/253-2000, \$249. Image-editing/photo-enhancement program is a useful tool. *Sep 95, p. 81*

★★★ **PhotoFlash 2.0**, Apple Computer, 408/996-1010, \$129. Image-editing utility provides basic image-retouching tools at a reasonable price. *Jul 95, p. 67*

★★★ **PhotoFusion 2.0.3**, Ultimate, 818/993-8007, \$695. Photoshop compositing plug-in is hampered by a poor interface. *Oct 95, p. 83*

★★★ **PixelPutty Solo (1.5)**, The Valis Group, 415/435-5404, \$399. Affordable modeler lets you manipulate 3-D objects as if they were clay. *Jun 95, p. 77*

★★★★ **Poser 1.0**, Fractal Design, 408/668-5300, \$199. 3-D illustration tool generates posable human figures. *Oct 95, p. 63*

★★★★ **PowerCADD 2.0**, Engineered Software, 910/299-4843, \$795. CAD program features exceptional speed and an extensive array of tools. *Oct 95, p. 77*

★★★★★/7.2 **QX-Tools 1.0**, Extensis, 503/274-2020, \$149. Ten XTensions that make QuarkXPress more powerful. *Feb 96, p. 73*

★★★ **Ray Dream Designer 3.1.1**, Ray Dream, 415/960-0768, \$349. 3-D graphics program provides competent modeling tools and excellent rendering. *Mar 95, p. 61*

★★ **Select 1.6**, Human Software, 408/741-5101, \$245. CMYK color-correction plug-in duplicates many Photoshop functions. *Jul 95, p. 81*

★★★★★/8.7 **SmartSketch 1.0**, FutureWave Software, 619/637-6190, \$69.95. Makes drawing and editing paths as easy as painting. *Mar 96, p. 106* **Editors' Choice** for best natural-draw programs.

★★★★★/5.0 **Tracer 1.0**, ScanVec, 508/694-9488, \$795. Excellent but expensive autotracing. *Feb 96, p. 85*

★★★★ **Transverter Pro 3.0**, TechPool Studios, 216/382-1234, \$395. Graphics-conversion tool deserves a place in every desktop publisher's toolbox. *Nov 95, p. 77*

★★★★★/8.7 **upFront 2.0.1**, SketchTech, 612/379-1435, \$299. A new vendor—SketchTech—improves Alias's venerable entry-level 3-D modeling package. *Mar 96, p. 86*

★★★ **Virtus WalkThrough Pro 2.0**, Virtus, 919/467-9700, \$495. Aside from occasional stumbles, this 3-D design tool is an exceptional program. *Apr 95, p. 59*

★★★★ **Vision 3d 4.0**, Strata, 801/628-5218, \$695. 3-D modeling, rendering, and animation package offers excellent tools. *Jul 95, p. 56*

★★★ **Working Model**, Visual Basic, 415/574-7777, \$2495. Motion-simulation system is a fine product, but a Power Mac version is needed. *Dec 95, p. 79*

★★ **xRes 1.11**, Fauve Software, 415/543-7178, \$799. Image editor applies a variety of effects to selected areas of a large composition. *Jul 95, p. 60*

MATH/SCIENCE

★★★★ **The Fuzzy Logic Toolbox 1.0**, MathWorks, 508/653-1415, \$895. Math-simulation aid incorporates fuzzy logic into models. *Sep 95, p. 89*

★★★★★/7.5 **Igor Pro 2.0.4**, WaveMetrics, 503/620-3001, \$495. Top-notch scientific graphing package. *Feb 96, p. 90*

★★★★ **LabView 3.1**, National Instruments, 512/794-0100, \$1995. Instrumentation software can emulate most scientific and electronic test-bench

instruments. *Nov 95, p. 62*

★★★★ **MLab**, Civilized Software, 301/652-4714, \$1495. Mathematical-modeling software does fast computations on real-world problems. *Apr 95, p. 83*

★★★★★/7.1 **SPSS 6.1**, SPSS, 312/329-2400, \$695; modules \$395 to \$495. Mainframe statistics giant has new Mac interface. *Feb 96, p. 82*

★★★★★/8.3 **StatView 4.5**, Abacus Concepts, 510/540-1949, \$595. Statistics and graphing package. *Feb 96, p. 81*

ORGANIZATION/PRODUCTIVITY

★★★★ **ClarisWorks 4.0**, Claris, 408/727-8227, \$129. Integrated program's word processor and database are superb. *Oct 95, p. 62* **Editors' Choice** for best integrated software. *Nov 95, p. 124*

★★ **ClientTrac 2.0**, Whiskey Hill Software, 415/851-8702, \$99. PIM is easy to use but slim on speed, features, and flexibility. *May 95, p. 75*

★★★/3.7 **Day-Timer Organizer 2.0**, Day-Timer Technologies, 415/572-6260, \$59.95. PIM has some rough edges. *Mar 96, p. 92*

★★★ **Expresso 1.0**, Berkeley Systems, 510/540-5535, \$69.99. Calendar program is attractive and easy to use but its address book is weak. *Apr 95, p. 73*

★★★★ **FastTrack Schedule 3.0**, AEC Software, 703/450-1980, \$299. Updated version of this project planner includes customizable features. *Aug 95, p. 79*

★★★★ **In Control for Workgroups 3.5**, Attain, 617/776-1110, \$149.95; 10-pack \$949.95. Flexible project planner/scheduler combines an outliner and a calendar. *Sep 95, p. 93*

★★★ **InfoGenie 1.0.5**, Casady & Greene, 408/484-9228, \$79.95. Free-form data manager is appealing but lacks some of the competition's features. *Nov 95, p. 87*

★★★ **InTouch 2.5**, Prairie Group, 515/225-3720, \$69.95. Free-form contact manager offers speedy access to information. *Sep 95, p. 69*

★★★ **Microsoft Works 4.0**, Microsoft, 206/882-8080, \$99.95. Good word processing and drawing tools; poor spreadsheet and database modules. *Jan 95, p. 63*

★★★★ **Now Up-to-Date and Contact 3.5**, Now Software, 503/274-2800, \$99. Calendar/address book combo features several enhancements. *Nov 95, p. 68*

★★ **Peanuts Family Organizer 1.0**, Individual Software, 510/734-6767, \$19.95. Organizer's endearing interface doesn't make up for missing features. *Jun 95, p. 81*

PRESENTATION TOOLS

★★★★ **Adobe Premiere 4.0 (4.0.1)**, Adobe Systems, 415/961-4400, \$795. Advances far and above its competitors with professional-level features. *Dec 94, p. 54*

★★★★★/7.1 **Astound 2.0**, Gold Disk, 408/982-0200, \$249. Presentation graphics with a multimedia twist. *Mar 96, p. 73*

★★★★ **Authorware Professional 3.0**, Macromedia, 415/252-2000, \$4995. Multimedia authoring program is feature-packed but costly. *Dec 95, p. 66*

★★★ **CyberSound FX 1.0**, InVision Interactive, 415/812-7380, \$129. Plug-ins for Premiere make audio more polished, but access is cumbersome. *continues*

Star Ratings

Nov 95, p. 91

- ★★★ **Electronic Marker 1.0.2**, Consumer Technology Northwest, 503/643-1662, \$34.95. Annotation tool can enhance demonstrations but needs better layer tools. *May 95, p. 71*
- ★★★ **HyperCard 2.3**, Apple Computer, 408/996-1010, \$129. Authoring tool is an inexpensive solution for multimedia developers. *Nov 95, p. 66*
- ★★ **Living Album 2.5**, QuickMedia Labs, 408/749-9200, \$129.95. Multimedia album is hampered by a crowded interface. *May 95, p. 81*
- ★ **MediaFactory 1.0**, Nuts Technologies, 408/980-7800, \$199. Entry-level QuickTime movie editor has an awkward interface. *Nov 95, p. 89*
- ★★★★ **MediaPaint 1.0**, Strata, 801/628-5218, \$695. QuickTime paint program lets multimedia developers edit ranges of frames. *Sep 95, p. 56*
- ★★★ **Microsoft PowerPoint 4.0**, Microsoft, 206/882-8080, \$339. Presentation-graphics program is a good choice to use along with Word or Excel. *Feb 95, p. 67*
- ★★ **mPower 2.0**, Multimedia Design, 704/523-9493, \$295. Multimedia authoring tool is too limited to be compelling. *Apr 95, p. 81*
- ★★★★ **Persuasion 3.0**, Adobe Systems, 206/622-5500, \$495. Extensive charting options and hypertext options are key additions. *Sep 94, p. 65*
- ★★★★ **Presenter Professional 3.0**, VIDL, 818/358-3936, \$1995. 3-D modeling/animation package is an excellent choice for multimedia producers. *May 95, p. 59*
- ★★ **Special Delivery 2.0**, Interactive Media, 415/948-0745, \$399. Multimedia authoring tool isn't the best choice for complex projects. *Apr 95, p. 79*
- ★★★★ **TransJammer**, Elastic Reality, 608/273-6585, \$99. Plug-in for Premiere and VideoShop offers 100 video-transition effects. *Aug 95, p. 83*

PROGRAMMING

- ★★★★ **AppWare 1.2**, Novell, 801/429-7000, \$495. Development system features an easy-to-use graphical programming method. *Oct 95, p. 68*
- ★★★★/8.4 **CodeWarrior Gold 7**, Metrowerks, 512/305-0400, \$399. Key Power Mac compiler gets yet another face-lift. *Mar 96, p. 69*
- ★★★★ **FaceSpan 2.0**, Software Designs Unlimited, 214/578-6700, \$199. AppleScript interface builder lets developers create sophisticated applications. *Nov 95, p. 64*
- ★★★★ **JAM 6**, JYACC, 212/267-7722, \$2000. Development tools enable creation of large-scale corporate client-server databases. *Oct 95, p. 70*
- ★★★★/8.0 **LS FORTRAN 1.1**, Fortner Research, 703/478-0181, \$695. FORTRAN rides again, running science programs on the Power Mac desktop. *Feb 96, p. 95*
- ★★★ **Script Debugger 1.0**, Late Night Software, 604/929-5578, \$129. Script-development software improves on AppleScript, except in the debugging department. *Nov 95, p. 85*
- ★★★★/8.4 **Scripter 1.0.1**, Main Event Software, 202/298-9595, \$199. AppleScript development system offers serious debugging power. *Mar 96, p. 88*
- ★★★ **Symantec C++ 8.0**, Symantec, 503/334-6054, \$499. Compiler has been improved and expanded

but demands lots of resources. *Jul 95, p. 62*

- ★★★★/7.0 **Tools Plus 2.6**, Water's Edge Software, 416/219-5628, For Symantec's C/C++ and Pascal \$149 each; for both \$199; for CodeWarrior Bronze \$199; for CodeWarrior Gold \$249. Programmers' tool kit saves time. *Feb 96, p. 92*

UTILITIES

- ★★ **Adobe ScreenReady 1.0**, Adobe Systems, 415/961-4400, \$199. PostScript image rasterizer can aid multimedia developers but has some flaws. *Dec 95, p. 71*
- ★★★ **Aladdin Desktop Tools 1.0**, Aladdin Systems, 408/761-6200, \$89.95. Utilities collection is uneven but a worthwhile buy. *Aug 95, p. 69*
- ★★★ **Arcserve for Macintosh 1.5**, Cheyenne Software, 516/484-5110, \$245 (5 users); \$495 (20 users). A good backup program for mixed-platform networks. *Jan 96, p. 63*
- ★★★/6.2 **At Ease 3.0**, Claris, 408/727-8227, \$46. This desktop alternative lets you share your Mac and worry less. *Feb 96, p. 81*
- ★★★★ **At Ease 3.0 for Workgroups**, Apple Computer, 408/996-1010, \$295. Desktop alternative is a handy tool for network administrators. *Nov 95, p. 83*
- ★★★★ **BeyondPress 1.0**, Astrobyte LC, 303/534-6344, \$595. QuarkXPress XTension is a great way to convert documents to Web pages. *Dec 95, p. 73*
- ★★★ **CanOpener 3.0**, Abbott Systems, 914/747-4171, \$125. Utility opens many types of files but falls short in file-search department. *May 95, p. 67*
- ★★★★ **CD Directory 1.0**, Insignia Solutions, 415/694-7600, \$69.95. Utility stores catalogs of CD directories on a hard drive. *Jul 95, p. 73*
- ★★★ **Color Compass 1.0**, Praxisoft, 703/729-3391, \$129. Speedy, specialized tools blend, match, and tweak colors. *Aug 95, p. 77*
- ★★★★ **Conflict Catcher 3**, Casady & Greene, 408/484-9228, \$99.95. Extension-management utility offers a friendly, flexible approach to conflict resolution. *Sep 95, p. 69*
- ★★★★ **Disc-To-Disk**, Optical Media International, 408/376-3511, \$199. Audio-capture utility is a useful tool for multimedia authors. *Jun 95, p. 69*
- ★★★/6.8 **DOS Mounter 95 1.0**, Software Architects, 206/487-0122, \$100. Windows-to-Mac file-transfer utility gets Win 95-savvy. *Mar 96, p. 74*
- ★★★ **DragStrip 1.0**, Natural Intelligence, 617/876-4876, \$39.95. Icon-based file and folder organizer brings order to cluttered desktops. *May 95, p. 79*
- ★★★ **File Genie Pro 1.1**, Duet Development, 408/559-3838, \$89. Disk- and file-management utility is fast but has limited search and sort criteria. *Oct 95, p. 87*
- ★★★★ **FolderBolt Pro 1.0.3**, Kent Marsh, 713/522-5625, \$129.95. Top-notch encryption schemes secure your Mac's contents. *Jul 95, p. 77*
- ★★★ **Gear 2.5**, Elektroson, 610/617-0850, \$799. CD-recordable mastering software is a mixed bag. *Sep 95, p. 91*
- ★★★★ **Graffiti 1.01**, Palm Computing, 415/949-9560, \$79. Teach yourself a new writing system that Newton can handle. *May 95, p. 77*
- ★★★ **Here & Now 1.0**, Software Architects, 206/487-0122, \$89.95. File-transfer utility facilitates putting a Mac disk in a PC. *Nov 95, p. 81*
- ★★★★ **InstantReplay 1.0**, Strata, 801/628-5218, \$149. Utility records on-screen activity and saves it

as a QuickTime movie. *Sep 95, p. 89*

- ★★/4.5 **MacOpener 1.0**, DataViz, 203/268-0030, \$75. Unintuitive Mac-to-Windows file-transfer utility. *Mar 96, p. 75*
- ★★★ **MacTools Pro 4.0**, Symantec, 503/690-8090, \$149.95. This utility does a good job of diagnosing and fixing disk problems, but suffers from large RAM requirements and expensive tech support. *May 95, p. 73*
- ★★★ **Menu Master Mac**, Electronic Learning Systems, 904/375-0558, \$99; 15-site license \$299. Security software is useful but could use some additional features. *Sep 95, p. 95*
- ★★★★ **MultiClip Pro 3.1**, Olduvai, 305/670-1112, \$59. Utility is what Apple's Clipboard and Scrapbook should have been. *Apr 95, p. 67*
- ★★★ **Multimedia Utilities 1.1**, Motion Tool Works, 415/541-9333, \$99.95. Six appealing utilities address QuickTime moviemaking but you should remember to save often. *Jul 95, p. 71*
- ★★★ **Norton Utilities for Macintosh 3.1**, Symantec, 503/334-6054, \$149.95. Utilities suite features strong disk repair and data recovery but weak backup. *Feb 95, p. 63*
- ★★★★ **Now Utilities 5.0**, Now Software, 503/274-2800, \$89. Well-integrated collection of utilities. *Jan 95, p. 65*
- ★★★ **On Cue II Utilities 3.0**, ComputerEasy International, 602/829-9614, \$99.95. Eight utilities add functionality to the Mac Operating System. *Sep 95, p. 93*
- ★★★★ **OptiMem RAM Charger 2.0.1**, Jump Development Group, 412/681-2692, \$129. Use RAM more efficiently with this memory-management utility. *Jul 95, p. 75*
- ★★★ **PaperPower 1.0**, Piptel, 513/294-6656, \$149. Graphics-tablet utility is useful for macros, but its overlays can be tricky. *Apr 95, p. 87*
- ★★★★ **Power Secretary Power Edition 2.0**, Articulate Systems, 617/935-5656, \$2495. Speech-recognition program learns your voice patterns as you use it. *Sep 95, p. 60*
- ★★★★ **QuickKeys 3.0**, CE Software, 515/221-1801, \$139. Easy-to-use shortcut manager. *Mar 94, p. 61*
- ★★★★ **RAM Doubler 1.0.1 (1.5)**, Connectix, 415/571-5100, \$99. Inexpensive system extension really does double your RAM. *May 94, Editors' Choice* for best memory booster. *Jun 94, p. 118*
- ★★★ **RapidCD 1.04**, Insignia Solutions, 415/694-7600, \$69.95. Utility provides speedy access to frequently used data on CD-ROM. *Jul 95, p. 73*
- ★★★ **RescueTxt 1.0**, Abbott Systems, 914/747-3116, \$79. Text-retrieval utility works well but doesn't tell you the source file's name. *Apr 95, p. 83*
- ★★★★ **S/Link 2.0**, Synclavier, 603/448-8887, \$249. Utility is a valuable aid for anyone who does audio file conversion. *Nov 95, p. 91*
- ★★★★/8.4 **SCSI Director Pro 4.0**, Transoft, 805/897-3350, \$99.95. Hard disk formatting and testing utility. *Feb 96, p. 86*
- ★★★★/8.9 **Speed Doubler 1.0.2**, Connectix, 415/571-5100, \$99. Connectix makes a Power Mac's 680X0 emulation feel native. *Feb 96, p. 56*
- ★★★★ **Stuffit Deluxe 3.5**, Aladdin Systems, 408/761-6200, \$129.95. If you're looking for a compression solution, this is it. *Mar 95, p. 69*
- ★★★★ **TypeTamer 1.0.4**, Impossible Software, 714/470-4800, \$59.95. Versatile font utility provides information on installed fonts and simplifies tasks such as typing special characters and reselecting fonts from the menu. *May 95, p. 77*

- ★★★ **ultraSecure 3.524**, usrEZ Software, 714/756-5140, \$239. Security program offers a comprehensive set of protection tools. *Sep 95, p. 81*
- ★★★★ **Virex 5.5.1**, Datawatch, 508/988-9700, \$99.95. Comprehensive, reliable, and speedy virus-detection utility helps protect files. *May 95, p. 65*
- ★★★ **Zonkers 1.0**, Nova Development, 818/591-9600, \$19.95. Redecorate your Mac with a collection of silly desktop enhancements. *Aug 95, p. 89*

VERTICAL MARKETS

- ★★★ **ConcertWare 1.5.7**, Jump Software, 415/917-7460, \$159. Music-notation program is affordable and easy to use, but lacks features. *Jun 95, p. 75*
- ★★★★ **FreeStyle 1.01**, Mark of the Unicorn, 617/576-2760, \$200. Music sequencer with notation is a good choice for beginners. *Nov 95, p. 70*
- ★★★ **Insta Software**, Chang Labs, 408/727-8096, \$29 per module. No-frills relational databases handle forms and record-keeping for businesses. *Aug 95, p. 77*
- ★★★★ **Nightingale 2.0**, TAP Music Systems, 206/462-1007, \$495. Music-notation software is fast, feature-laden, and easy to learn. *Oct 95, p. 81*
- ★★★★ **Overture 1.02**, Opcode Systems, 415/856-3333, \$495. Easy-to-learn music-notation software has a friendly interface. *Apr 95, p. 75*
- ★★★/6.9 **Quicken Family Lawyer 6.0b**, Parsons Technology, 319/395-9626, \$49. Helps you prepare 61 legal documents. *Feb 96, p. 88*
- ★★★ **Route 66 1.5**, Route 66 Geographic Information Systems B.V., 415/957-0666, \$79.95. Route planner is fast but omits some cities. *May 95, p. 65*
- ★★★ **Storyboard Artist 1.5**, PowerProduction Software, 310/937-4411, \$499. Storyboard-creation software is useful but expensive. *Oct 95, p. 91*
- ★★ **Visual Arranger 1.0**, Yamaha Corp. of America, 714/522-9240, \$59.95. Song-building software is innovative, but replacing notation with icons doesn't work. *Nov 95, p. 89*

WRITING TOOLS

- ★★★★ **EndNote Plus 2.0**, Niles & Associates, 510/649-8176, \$299. Indispensable bibliography and citation manager is easy to learn and use. *Apr 95, p. 77*
- ★★★ **FullWrite 2.01**, Akimbo Systems, 617/776-5500, \$395. Although its modular architecture is complex, this word processor is worth considering. *Apr 95, p. 69*
- ★★★ **Inspiration 4.1**, Inspiration Software, 503/245-9011, \$195. Writing tool shows the relationships between ideas. *Apr 95, p. 75*
- ★★★ **Microsoft Word 6.0 (6.0.1)**, Microsoft, 206/882-8080, \$339. Word processor's many new features may benefit users with fast Macs. *Feb 95, p. 53*. **Editors' Choice** for best high-end word processor. *Mar 95, p. 106*
- ★★★ **Nisus Writer 4.0**, Nisus Software, 619/481-1477, \$495. Word processor excels in specialized areas but has flawed table editor. *Mar 95, p. 53*
- ★★ **Read-It O.C.R. Pro 5.0**, Olduvai, 305/670-1112, \$395. OCR software has nice features but its recognition engine isn't up to par. *Apr 95, p. 79*
- ★★★★/7.1 **Spelling Coach Professional 4.1**, Deneba Software, 305/596-5644, \$69.95. Adds dictionary and thesaurus to almost any application. *Mar 96, p. 80*

- ★★★ **Three by Five 2.0**, MacToolkit, 310/395-4242, \$99. Idea organizer uses the metaphor of index cards on a corkboard. *Aug 95, p. 87*
- ★★★/6.7 **WordPerfect 3.5**, Novell Business Applications, 801/225-5000, \$189. Popular word processor adds HTML editor. *Feb 96, p. 61*

h a r d w a r e

INPUT DEVICES

- ★★★★ **ArtPad**, Wacom Technology, 360/750-8882, \$199. Pressure-sensitive tablet is sheer convenience. *Apr 95, p. 67*
- ★★★★ **ArtZ II**, Wacom Technology, 360/750-8882, \$389.99. Graphics tablet has unique stylus that erases as well as draws. *Dec 95, p. 79*
- ★★★ **ChoiceStick 1.0.2**, Kernel Productions, 302/456-3026, \$69.95. Port lets you attach a pair of joysticks to a Mac. *Sep 95, p. 85*
- ★★★/6.0 **Desktop GlidePoint**, Alps Electric, 408/432-6000, \$99.95. New input device offers adjustable base and cursor-release delay. *Feb 96, p. 68*
- ★★★★ **DrawingSlate II**, CalComp, 602/948-6540, \$395. Responsive digitizing tablet is an excellent choice for artists and illustrators. *Jun 95, p. 83*
- ★★★ **GlidePoint**, Alps Electric, 408/432-6000, \$99. Alternative pointing device lets you position the cursor by moving your finger. *Jul 95, p. 77*
- ★★ **Jetstick**, CH Products, 619/598-2518, \$74.95. Joystick's hardware is fine, but its manual and software are inadequate. *Sep 95, p. 95*
- ★★★ **MacAlly**, The Mace Group, 213/780-6110, \$49. ADB mouse doesn't stand out from the crowd, but is durable and affordable. *Jul 95, p. 75*
- ★★★ **Mouse-Trak**, Itac Systems, 214/494-3073, \$179. Input device is sturdy, but buttons can be hard to reach. *Nov 95, p. 83*
- ★★★★/9.6 **PaperPort Vx**, Visioneer, 415/493-9599, \$369. Desktop document scanner just gets better. *Mar 96, p. 82*
- ★★ **Point Pad**, Hagiwara Sys-Com, 619/546-9989, \$99. Pointing device is compact but can be awkward to use. *Oct 95, p. 87*
- ★★★★/7.0 **QuePoint II**, MicroQue, 801/263-1883, \$79.95. Despite the drawbacks of a touchpad, the QuePoint's excellent software makes it a clear winner. *Feb 96, p. 68*
- ★★★ **Remote Point**, InterLink Electronics, 805/484-1331, \$199. Cordless pointing device is handy, but controlling objects onscreen can be hard. *Apr 95, p. 85*
- ★★★★ **Thinking Mouse Macintosh ADB**, Kensington Microware, 415/572-2700, \$139.95. Mouse has 4 programmable buttons that can automate tasks. *May 95, p. 83*
- ★★/4.3 **TouchPad**, Touché Technologies, 612/830-1414, \$59.95. The TouchPad matches the PowerBook's dark case. *Feb 96, p. 68*
- ★★★ **Trackball Pro ADB**, CH Products, 619/598-2518, \$119.95. Inexpensive trackball falls short in programmability and overall functionality. *Sep 95, p. 91*

MISCELLANEOUS HARDWARE

- ★★★★/6.4 **Chinon ES-3000**, Chinon America, 310/533-0274, \$1095. Digital camera zooms in but with the high price doesn't measure up to Kodak Digital *continues*

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Star Ratings

Camera 40. Mar 96, p. 77

- ★★★★ **Colortron**, Light Source Computer Images, 415/925-4200, \$1195. Hand-held spectrophotometer helps match on-screen and printed colors. Jan 95, p. 56
- ★★★★ **DayStar PowerPro 601/DayStar Turbo 601**, DayStar Digital, 404/967-2077, PowerPro 601 \$1599; Turbo 601 \$1499. Impressive 601-based accelerator cards squeeze more performance out of Macs. Sep 95, p. 67
- ★★★ **Kodak Digital Camera 40**, Eastman Kodak, 716/726-7260, \$995. Digital camera can use 37mm lens but has some flaws. Jan 96, p. 59
- ★★★ **QuickTake 150**, Apple Computer, 408/996-1010, \$739. Digital camera is easy to use and includes close-up lens. Jan 96, p. 59
- ★★★★ **Reno Portable CD-ROM Player**, Media-Vision, 510/770-8600, \$349. Portable CD-ROM player is lightweight, versatile, and easy to set up. Jan 95, p. 65
- ★★ **Smart Label Printer EZ30**, Seiko Instruments USA, 408/922-5800, \$199. Label printer's print quality and speed are disappointing. Nov 95, p. 72
- ★★★ **SoftBoard Model 205**, Microfield Graphics, 503/626-9393, \$2795. Electronic whiteboard is expensive but does the job. Jan 96, p. 71

MODEMS/NETWORK HARDWARE

- ★★★ **GeoPort Telecom Adapter Kit**, Apple Computer, 408/996-1010, \$129.95. Adapter unlocks the capabilities of Apple's GeoPort modem. Oct 95, p. 75
- ★★★ **Internet Server Solution for WWW**, Apple Computer, 408/996-1010, \$2909. Web server is ideally suited for small-business sites. Oct 95, p. 65
- ★★ **Manta 500EN; Starfish Ethernet Access Point**, Digital Ocean, 913/888-3380, Manta \$799; Starfish \$1850. Wireless-communications package is capable but much too expensive. Dec 95, p. 77
- ★★★★ **OneWorld Combo**, Global Village Communication, 408/523-1000, \$1499 without modems; \$2099 with modems. Server is the very model of a multiuser modem pool. Sep 95, p. 78
- ★★★★ **OneWorld Internet 1.0, 700 Series**, Global Village Communication, 408/523-1000, \$1699 plus monthly fee. Internet gateway offers E-mail and Internet access in an approachable format. Jan 95, p. 63
- ★★★ **Power Class 28.8 Data/Fax Modem**, Motorola, 205/430-8000, \$395. Fax modem's hardware is superb, but it's hampered by mediocre software. Oct 95, p. 89
- ★★★★ **TelePort Platinum**, Global Village Communication, 408/523-1000, \$279. Reliable fax modem includes call recognition and an answering machine. Aug 95, p. 81

PRINTERS

- ★★★★ **Apple Color StyleWriter 2200**, Apple Computer, 408/996-1010, \$419. Portable ink-jet printer is ideal for color output when you're on the road. Nov 95, p. 66
- ★★★★ **Apple Color StyleWriter 2400**, Apple Computer, 408/996-1010, \$525. Economical color ink-

jet printer offers gorgeous output. Apr 95, p. 63

- ★★★★ **Fargo FotoFun**, Fargo Electronics, 612/941-9470, \$399.95. Dye-sublimation printer produces good output at a reasonable price. Jan 96, p. 61
- ★★★/5.4 **HP CopyJet M**, Hewlett-Packard, 800/752-0900, \$3649. Color copier and ink-jet printer in a single unit. Feb 96, p. 77
- ★★★★ **HP LaserJet 5MP**, Hewlett-Packard, 800/752-0900, \$1299. Laser printer meets the high demands of small businesses and home offices. Jul 95, p. 58
- ★★★★ **LaserWriter 4/600 PS**, Apple Computer, 408/996-1010, \$929. Compact printer produces great-looking 600-dpi output. Dec 95, p. 60
- ★★ **Nikon Coolprint**, Nikon Electronic Imaging, 516/547-4355, \$2350. Color dye-sublimation printer is fast, but print quality is flawed. Sep 95, p. 83
- ★★★ **Phaser 140**, Tektronix, 503/627-7111, \$1695. Ink-jet is a capable color printer for a small workgroup. Apr 95, p. 63
- ★★★ **Pictura 310**, Fargo Electronics, 612/941-9470, \$4995; optional Adobe Level 2 PostScript package \$795. Printer produces acceptable print quality, but its color-matching capabilities are substandard. Jul 95, p. 61. **Editors' Choice** for best low-end dye-sublimation printer. Jan 96, p. 94
- ★★★★ **StyleWriter 1200**, Apple Computer, 408/996-1010, \$269. Newest model of Apple's ink-jet printer offers improved print quality. Sep 95, p. 65
- ★★★★ **Stylus Color**, Epson America, 310/782-0770, \$699. Color ink-jet's print quality is superb and its price is reasonable. May 95, p. 58
- ★★★ **Typhoon 8**, Dataproducts, 818/887-8000, \$3100 (600 dpi, 4MB of RAM); \$5199 (1200 dpi, 36MB of RAM). Workgroup printer offers top-notch 1200-dpi output but is a bit pricey. Dec 95, p. 64
- ★★ **Xerox 4510ps**, Xerox, 800/349-3769, \$1745. Printer has neither the performance nor the quality to justify its price. Dec 95, p. 68

SCANNERS

- ★★/3.3 **ArtiScan Z1-600**, Tamarack, 714/744-3979, \$649. The ArtiScan Z1-600's poor software, manual, and scanning performance make it hard for us to recommend it, even at its low price. So we won't. Mar 96, p. 118
- ★★/3.3 **Color OneScanner**, Apple Computer, 408/996-1010, \$859. The Color OneScanner's anemic software bundle and lackluster performance would make it an unexceptional offer even if reasonably priced. Mar 96, p. 118
- ★★/3.1 **CS-300**, Ricoh, 408/954-5326, \$599. The CS-300 scanner has one thing going for it: it's dirt cheap. Unfortunately, with performance, software, and documentation this weak, it's still overpriced. Mar 96, p. 118
- ★ **Digital Fotovix IIS-D**, Tamron Industries, 516/484-8880, \$2299. Video slide scanner's image quality doesn't measure up to the competition. Jan 96, p. 67
- ★★★★/7.2 **ES-1200C**, Epson, 310/782-0770, \$1299. The ES-1200C scanner has great image quality, respectable speed, and good software, all at a reasonable price. Mar 96, p. 118. **Editors' Choice** for best midrange scanner.
- ★★★ **Fujitsu ScanPartner Jr.**, Fujitsu Computer Products of America, 408/432-6333, \$499. Compact scanner with good OCR software is an economical scanning solution. Jul 95, p. 63
- ★★★★/7.1 **Gemini D-16**, Umax, 510/651-4000, \$1895-\$1995. The Gemini D-16 is unique in being

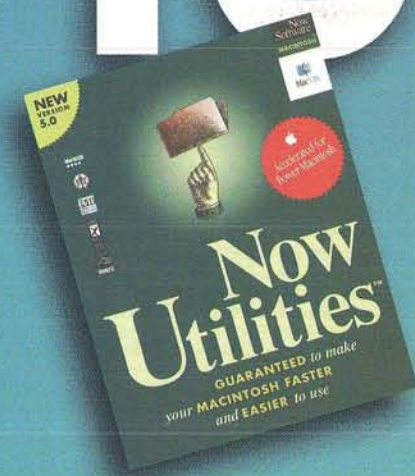
both a 400-dpi and 800-dpi scanner, depending on the scanning area. But for several hundred dollars above its competitors, you'd better need that extra resolution. Mar 96, p. 118

- ★★★★ **HP ScanJet 3c**, Hewlett-Packard, 208/323-2551, \$1179. Economical scanner offers a broad tonal range and accurate colors. Oct 95, p. 79
- ★★★/6.1 **HP ScanJet 4c**, Hewlett-Packard, 208/396-2551, \$1175. The HP ScanJet 4c is a respectable performer in all categories, though not exceptional. Limited software is its greatest weakness. Mar 96, p. 118
- ★★/3.8 **IX-4015**, Canon, 714/438-3000, \$799. Boasts desk-space economy and an exceptional warranty, but its performance and software bundle are mediocre. Mar 96, p. 118
- ★★/4.0 **Paragon 1200SP**, Mustek, 714/250-8855, \$899-\$1000. The Paragon 1200SP is a disappointment, from its performance to its bare-bones manual. Proof that a 600-dpi, 30-bit scanner for \$799 isn't a bargain. Mar 96, p. 118
- ★★ **Pro Imager 4000**, PixelCraft, 510/562-2480, \$2995. Scanner delivers excellent highlight detail but produces noise in shadow areas. Jun 95, p. 59
- ★★★★ **Pro Imager 8000**, PixelCraft, 510/562-2480, \$12,995. Demanding prepress users will like this scanner. Jun 95, p. 59
- ★★★ **Reli 4830T**, Relisys, 408/945-9000, \$1699. If you can live with slow performance, this scanner is a bargain. Jun 95, p. 71
- ★★★/5.0 **ScanMaker IIs**, Microtek, 310/297-5000, \$499-\$699 (street). The ScanMaker IIs is a shaky performer at best, especially when it comes to capturing highlight detail (it doesn't), but it's an option for the bargain hunter. Mar 96, p. 118
- ★★★/5.8 **ScanTouch AX-1200**, Nikon, 516/547-4355, \$1720. The ScanTouch AX-1200 is a solid performer, but at this price it should be closer to stunning. Mar 96, p. 118
- ★★★/5.6 **Silverscanner III**, La Cie, 503/520-9000, \$1499-\$1699. The Silverscanner III is a good performer in many respects, but its poor color accuracy and high price place it behind the Epson ES-1200C on which it's based. Mar 96, p. 118
- ★★★★ **SprintScan 35**, Polaroid, 617/386-2000, \$2495. Compact, efficient, cost-effective scanner transfers slides or negatives to a Mac. Jun 95, p. 79
- ★★★/5.9 **StudioScan IIs**, Agfa, 508/658-5600, \$900 (street). The StudioScan IIs gets good performance from its 30-bit, 400-dpi engine. Agfa's software is powerful and flexible but could be easier to use. Mar 96, p. 118
- ★★★ **Vista-58**, Umax Technologies, 510/651-8883, \$995 (LE+); \$1095 (Pro+). 24-bit color flatbed scanner has a lot of useful features for its low price. Jul 95, p. 67

SPEAKERS

- ★★★★/8.8 **Acoustimass**, Bose, 508/879-7330, \$699. Full, rich, natural sound; treble slightly rolled off but clean. Mar 96, p. 157. **Editors' Choice** for best high-end three-piece speakers.
- ★★★★/7.1 **ACS 52**, Altec Lansing, 717/296-2818, \$128. Clean, reasonably solid presentation; crisp highs; powerful bass for such a small design. Mar 96, p. 157
- ★★★★/7.1 **AMX-16**, Radio Shack, 817/390-3300, \$120 (street). Clean, reasonably crisp, slightly bright, decent bass, somewhat lacking in low-end heft. Mar 96, p. 157
- ★★★/6.8 **AppleDesign Powered Speakers**, Apple

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Computer, 408/996-1010, \$179. Clean, reasonably solid presentation. Bass is good but doesn't shake the foundation. *Mar 96, p. 157*

★★★/4.9 **AV270 Powered Speakers**, Advent, 708/317-3700, \$179. Clean and smooth. Somewhat tinny quality to midrange and highs. *Mar 96, p. 157*

★★★/6.2 **AV622 Powered Speakers**, Advent, 708/317-3700, \$299. Clean and smooth, with somewhat lightweight character. Slight treble emphasis. Bass has reasonable weight and impact. *Mar 96, p. 157*

★ **EAB401P Speakers**, Panasonic Communications & Systems, 800/742-8086, \$99. Small, inexpensive speakers provide less-than-state-of-the-art performance. *Apr 95, p. 58*

★★ **EAB701P Speakers**, Panasonic Communications & Systems, 800/742-8086, \$249. The sound of these speakers is thin and slightly harsh. *Apr 95, p. 58*

★★★/5.2 **J-688AV**, Jazz, 818/336-2689, \$149. Reasonably smooth sound, noticeably rolled-off high end, slightly harsh midrange becomes a bit fatiguing over a long listening session. *Mar 96, p. 157*

★★/4.7 **J-902**, Jazz, 818/336-2689, \$150. Clear reproduction, with moderate bass emphasis and overemphasized treble. Generally thin sonic character because of the high-frequency emphasis. *Mar 96, p. 157*

★★★/5.8 **JPS 45**, Jensen, 708/317-3700, \$149. Clean, reasonably crisp, slightly bright; an almost sandpaper effect on cymbals; adequate bass, but somewhat lacking in low-end heft. *Mar 96, p. 157*

★★/3.5 **LCS-3210**, Labtec, 360/896-2000, \$119 (street). Decent, slightly boomy bass, harsh midrange, rolled-off treble. Sound gets harsher when played at loud volumes. *Mar 96, p. 157*

★★★/6.2 **MA-12CP**, Roland, 213/685-5141, \$319. Relatively warm, well-balanced sound; slightly lightweight bass. Tends to sound harsh when played at normal volume levels. *Mar 96, p. 157*

★★★★/7.8 **MediaMate**, Bose, 508/879-7330, \$339. Full, warm, rich, natural sound. Cymbals had considerable clarity and detail and sounded realistic. Amazingly robust for such a small speaker. *Mar 96, p. 157. Editors' Choice* for best desktop speakers.

★★★/6.6 **MLI-95**, Midi Land, 909/592-1168, \$120. Surprisingly good sound for the money. Clean, reasonably clear; fine musical details are a wee bit indistinct; has good voice reproduction, adequate bass. Smooth highs, accurate presentation. *Mar 96, p. 157*

★★★★/7.5 **MMS 557**, Audio-Technica, 216/686-2600, \$150. Relatively clean, slightly bright, crisp sound. Surprisingly robust bass for a small box. *Mar 96, p. 157*

★★ **NEC AudioTower**, NEC Technologies, 708/860-9500, \$99. Speaker system's sound quality is nothing to shout about. *May 95, p. 81*

★★★★/7.9 **SoundWorks**, Cambridge SoundWorks, 617/332-5936, \$220. Clean, well-balanced sound, slight upper midrange emphasis, good bass. *Mar 96, p. 157. Editors' Choice* for best low-end three-piece speakers.

★★★/5.7 **SurroundSound ACS 500**, Altec Lansing, 717/296-2818, \$450. Robust sound, slightly smeared highs, and slight harshness when played at loud volume. Bass is powerful, but a bit boomy. *Mar 96, p. 157*

★★/3.7 **SW150**, Koss, 414/964-5000, \$180. Weak

bass, harsh midrange, rolled-off treble. No saving graces. *Mar 96, p. 157*

★★★/6.4 **TC1490-7SUB**, Multimedia Labs, 410/429-4300, \$249. Clean sound and thin balance; adjusting subwoofer output just makes bass boom, but bass is always lightweight. *Mar 96, p. 157*

★★★ **Vivid 3D Pro**, NuReality, 714/442-1080, \$149.95. Sound-enhancement system produces 3-D sound from a pair of speakers. *Aug 95, p. 87*

★★★/6.4 **YST-SS1010**, Yamaha Corp. of America, 714/522-9240, \$350. Relatively warm, well-balanced sound, slightly rolled-off treble with slight smearing effect on cymbals, average bass impact with subwoofer. Tends to sound harsh when played at loud volume levels. *Mar 96, p. 157*

SYSTEMS/STORAGE

★★★ **Envoy Wireless Communicator**, Motorola, 800/894-7353, \$1000 to \$1500. Magic Cap-based PDA was our reviewers' first choice for E-mail. *Aug 95, p. 62*

★★★★ **EZ135**, SyQuest Technology, 510/226-4000, \$249. Removable drive is fast and comes with a fine selection of bundled software. *Dec 95, p. 58*

★★★ **Marco Wireless Communicator**, Motorola, 800/894-7353, \$900 to \$1400. Newton OS-based PDA includes a radio modem. *Aug 95, p. 62*

★★★ **Master CD Pro**, MicroNet Technology, 714/453-6000, \$4995. Recordable CD-ROM drive is a good tool for professional CD production. *Aug 95, p. 83*

★★★★/7.5 **MessagePad 120 with Newton OS 2.0**, Apple Computer, 408/996-1010, \$699. If the first Newton had been this good, you'd already have one. *Mar 96, p. 57*

★★★/5.6 **Performa 5125CD**, Apple Computer, 408/996-1010, \$2300. The all-in-one design is appealing, but the performance is just so-so. *Feb 96, p. 96*

★★★★/7.1 **Power 100**, Power Computing, 512/258-1350, \$1699. Powerful and inexpensive, the Power 100 comes bundled with all the extras you'd want. *Feb 96, p. 96. Editors' Choice* for best home-and-small-office Mac.

★★★★/7.4 **Power 120**, Power Computing, 512/258-1350, \$1999. Like its Power 100 sibling, this system offers strong performance at a good price. *Feb 96, p. 96*

★★★/5.8 **PowerBook 5300**, Apple Computer, 408/996-1010, \$2300. A gray-scale screen and middling performance make this just an acceptable notebook. *Feb 96, p. 96*

★★★/5.9 **PowerBook 5300c**, Apple Computer, 408/996-1010, \$4500. A great color screen and strong expandability balance with so-so performance. *Feb 96, p. 58. Editors' Choice* for best portable Mac. *Feb 96, p. 96*

★★★★/5.9 **PowerBook 5300cs**, Apple Computer, 408/996-1010, \$3600. Good expansion, so-so speed, and a decent color screen make this fine for short-term use. *Feb 96, p. 96*

★★★/6.5 **Power Macintosh 7200/75**, Apple Computer, 408/996-1010, \$1600. A dumbed-down version of the 7500, this system offers just the basics. *Feb 96, p. 96*

★★★★/7.8 **Power Macintosh 7500/100**, Apple Computer, 408/996-1010, \$3100. Powerful and relatively inexpensive, the Power Mac 7500/100 shines in its easy-to-upgrade design. *Feb 96, p. 96. Editors' Choice* for best business-and-professional Macintosh.

continues

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(SCREEN REDRAW TIMES - SECONDS)*

*Test conducted on a Power Macintosh 8100/100AV for PowerCADD 2.0 and a Macintosh Quadra 630 for PowerDraw versions.

MACWORLD



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MacUser October 1995

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MacWEEK



MacWEEK July 10, 1995

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InfoWorld July 24, 1995

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Star Ratings

- ★★★ **Power Macintosh 8100/110**, Apple Computer, 408/996-1010, \$6379. Power Mac offers increased speed and improved NuBus circuitry. *Mar 95, p. 50*
- ★★★/7.7 **Power Macintosh 8500/120**, Apple Computer, 408/996-1010, \$4200. The 8500's 604 CPU and bundled cache give it good performance. *Feb 96, p. 96*. **Editors' Choice** for best publishing and graphics Mac and best media-authoring Mac.
- ★★★ **Power Macintosh 9500/132**, Apple Computer, 408/996-1010, \$5799. Power Macintosh offers speed, expansion, and lots of memory. *Oct 95, p. 60*
- ★★★★/7.6 **PowerWave 604/120**, Power Computing, 512/258-1350, \$3199. Power Computing has made the 604 CPU available at 601-based systems' prices. *Feb 96, p. 54*. **Editors' Choice** for best business-and-professional Mac. *Feb 96, p. 96*
- ★★★★/7.6 **PowerWave 604/132**, Power Computing, 512/258-1350, \$3699 (256K cache card included). This fast, sensibly priced system, which comes bundled with bonus software, is a great value. *Feb 96, p. 54*
- ★★★★/7.7 **PowerWave 604/150**, Power Computing, 512/258-1350, \$4499 (512K cache card included). The fastest Mac currently available, the price is not quite as attractive as for other PowerWave models. *Feb 96, p. 54*
- ★★ **RCD-1000**, Pinnacle Micro, 714/727-3300, \$1695. CD-Recordable drive is easy to use but too unreliable for day-to-day backup. *Jun 95, p. 81*
- ★★★/5.1 **SCSI PowerPlug II**, Hot Wire Technology, 203/761-0651, \$119.99. A fast way to swap SCSI devices. *Feb 96, p. 86*
- ★★★ **SledgeHammer8000FT**, FWB, 415/325-4392, \$23,599. Level 5 RAID array provides constant access to your stored information. *Sep 95, p. 59*
- ★★★ **Sony Magic Link**, Sony, 800/571-7669, \$699.95. Using this PDA is a breeze, but it lacks applications. *Aug 95, p. 62*
- ★★★/5.8 **System 100**, Radius, 408/541-6100, \$10,500. Radius bundles its mediocre digital-video cards on a relabeled Power Mac 8100—that's no wise investment. *Feb 96, p. 96*
- ★★★★ **Zip Drive**, Iomega, 801/778-1000, \$199.95; 100MB cartridge \$19.95. External drive combines speedy performance, convenience, and economy. *Jul 95, p. 59*

VIDEO/DISPLAY

- ★★/4.2 **AlphaScan GLX**, Sampo Technology, 770/449-6220, \$1495. Low price fails to outweigh poor image quality. *Feb 96, p. 165*
- ★★★/5.5 **Diamond Pro 21TX**, Mitsubishi Electronics America, 714/220-2500, \$2199. Washed-out colors hold back an otherwise strong contender. *Feb 96, p. 165*
- ★★★ **EAsycolor 24/1360**, EA Research, 510/867-0967, \$1699. Video board offers Photoshop CMYK acceleration and multisync monitor support. *Aug 95, p. 64*
- ★★★ **Encoder Pro**, P2 Systems, 206/525-2081, \$259. Inexpensive Mac-to-TV adapter is a good value. *Jan 96, p. 69*
- ★★/4.4 **FlexScan F2 21**, Nanao, 310/325-5202, \$2299. Blurry, dim image and too high a price. *Feb 96, p. 165*
- ★★★/4.8 **Multigraph 445X**, Nokia Display Products, 415/943-4071, \$2775. Adequate image quality, but at too high a price. *Feb 96, p. 165*
- ★★★/6.2 **Multiple Scan 20 Display**, Apple Computer, 408/996-1010, \$2149. Not as vibrant as it could be, but good value. *Feb 96, p. 165*
- ★★★/5.9 **MultiscanTC**, Sony, 408/432-0190, \$3950. Special color-adjustment tools don't overcome mediocre performance. *Feb 96, p. 165*
- ★★★★/7.3 **MultiSync XE21**, NEC Technologies, 508/264-8000, \$1899. Rich, bright images complemented by excellent controls. *Feb 96, p. 165*
- ★★★/5.8 **MultiView 21**, Radius, 408/541-5700, \$2149. Seductively rich colors, but too soft a focus. *Feb 96, p. 165*
- ★★★ **PaintBoard Prism GT**, RasterOps, 408/562-4200, \$999. Video board offers good QuickDraw acceleration but no Photoshop acceleration. *Aug 95, p. 64*
- ★★★/5.0 **PanaSync/Pro C2192P**, Panasonic Communications & Systems, 201/348-7000, \$1999. Reasonable price fails to overcome weak image quality. *Feb 96, p. 165*
- ★★★/6.6 **Pivot 1700**, Portrait Display Labs, 510/227-2700, \$1099. Good image quality but doesn't automatically switch views when rotated. *Mar 96, p. 70*
- ★★★★ **Presenter TView**, TView, 503/643-1662, \$449. Reliable Mac-to-TV adapter produces an excellent picture. *Jan 96, p. 69*
- ★★★/8.6 **PressView 21 SR**, Radius, 408/541-6100, \$3,999. The best professional-quality display gets better. *Feb 96, p. 62*
- ★★★ **QA-1500**, Sharp Electronics, 201/529-8731, \$5795. LCD panel's display is crisp, but placing a presentation on its PC Card is cumbersome. *May 95, p. 69*
- ★★ **Radius Telecast**, Radius, 408/541-6100, \$9995. QuickTime-based video editor has potential, but software is not yet mature. *Jan 96, p. 65*
- ★★★★/7.3 **RasterOps SuperScan Mc 21**, NSA/Hitachi, 617/461-8300, \$2299. Top performance plus sensible, intuitive controls create a winning combination. *Feb 96, p. 165*. **Editors' Choice** for best two-page monitor.
- ★★★★ **SpigotPower AV**, Radius, 408/541-6100, \$999. Make full-screen movies with this first-rate video-compression board. *Jun 95, p. 67*. **Editors' Choice** for best digital-video card. *Aug 95, p. 112*
- ★★/4.1 **SyncMaster 20GLs**, Samsung Electronics America, 201/691-6200, \$1599. Glare-catching, image-distorting tube and weak controls. *Feb 96, p. 165*
- ★★★★ **Targa 2000 1.2**, Truevision, 408/562-4200, \$5495. Video board offers good picture quality and fully synced 16-bit audio. *Dec 95, p. 71*
- ★★★★ **Thunder IV GX 1360**, Radius, 408/541-6100, \$2999. Video board provides impressive QuickDraw and Photoshop acceleration. *Aug 95, p. 64*
- ★★★ **VideoDirector 1.5**, Gold Disk, 408/782-0200, \$199.95. Low-end video-editing system logs, edits, and organizes videotape footage. *Jun 95, p. 75*
- ★★★/5.8 **ViewSonic 21PS**, ViewSonic, 909/869-7976, \$2095. Bright, vibrant, though not particularly sharp image. *Feb 96, p. 165*
- ★★★/5.3 **VisionMaster Pro 21**, Iiyama North America, 215/957-6543, \$1995. Good image quality, but confusing controls. *Feb 96, p. 165* **m**

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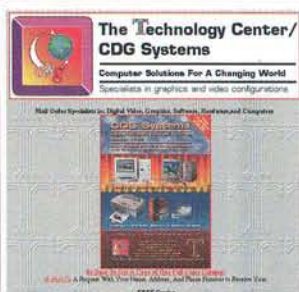
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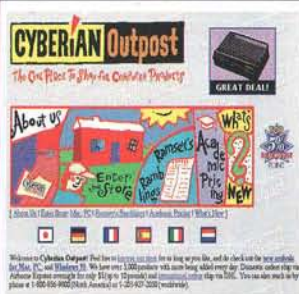
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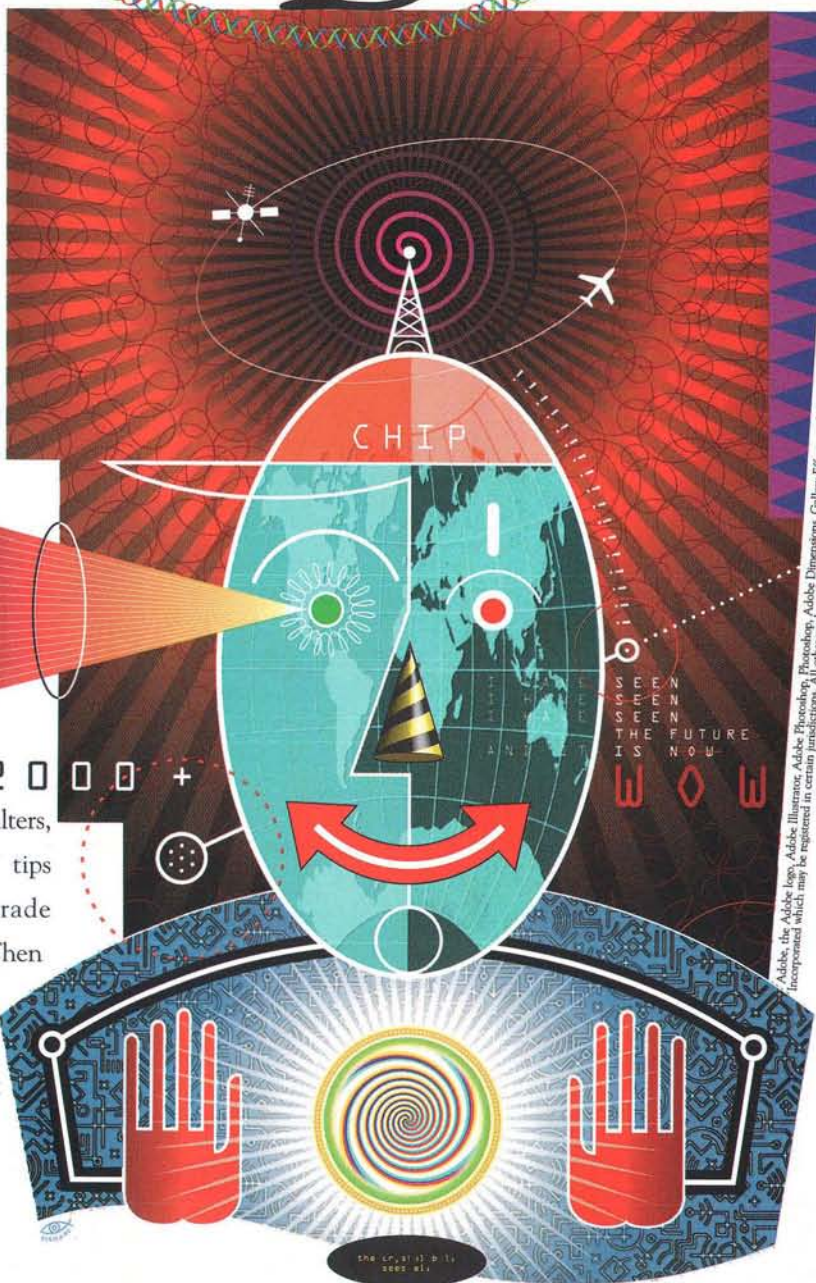
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BUSINESS	
Connectix	
RamDoubler-Mac/PowerMac (CNM RAMDOUBL-MP)	\$54.95
Symantec	
Norton Utilities 3.2-Mac/PowerMac (SMM NORTON3.2)	\$89.95
Intuit	
Quicken 6.0 (IUM QUICKEN6)	\$49.95
Microsoft	
Office 4.2-Mac/PowerMac (MSM OFFICE4.21)	\$449.95
Nisus	
Writer 4.1 with Language Key (NSM WRITER-LK)	\$199.95
Caere	
OmniPage Direct 2.0 (COM OMNIDIRECT2)	\$59.95
Ventanna	
Internet Membership Kit 2.0 (VNM INTERNET2)	\$44.95
Apple	
System 7.5-Mac/PowerMac (APP M2920LL)-Floppy (APP M2925LL)-CD	\$89.95
HSC	
KPT Vector Effects-Mac/PowerMac (HSM KPTVECTOR)	\$119.95
Quark	
Xpress 3.3-PowerMac Only (QUM QUARKPM-C)-CD	\$649.95
Edutainment	
Spectrum	
Tetris Gold (SHI TETRISGLD-C)-CD	\$24.95
Mindscape	
Mavis Beacon Teaches Typing (MDM MAVISTYPING)	\$29.95
Corel	
All Movie Guide (CRB ALLMOVIE-C)-CD	\$19.95
Voyager	
Amnesty Interactive (VOI AMNESTY-C)-CD	\$12.95
Comptons	
Interactive Encyclopedia 1995 (BTM CIE-C)-CD	\$44.95
Lucas Film	
Dark Forces (LFM DARKFORCE-C)-CD	\$49.95
Discovery	
Nile Passage to Egypt (DCA NILE-C)-CD	\$29.95
GT Interactive	
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- For PowerBook 190/5300 series

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- V.34 standard
- Includes GlobalFax™, GlobalFax™ OCR & Data communications software
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- Full-features, ultra high speed PCMCIA data/fax modem with internal DAA phone line interface
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- Advanced Parallel Technology
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Kodak Digital Camera 40

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- TWAIN acquire software

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Hewlett-Packard DeskWriter 600

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- 600 x 300 dpi black printing
- 3ppm
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- 600 dpi optical resolution, 2400dpi enhanced
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\$979.99 (HP C2529B)

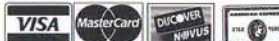
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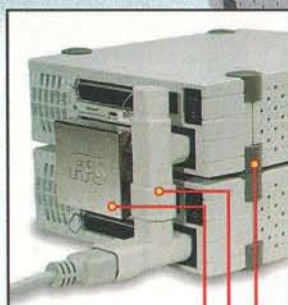
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Internal configuration



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APS DESKTOP DRIVES

Model	Capacity	Awards	Internal	SR2000
APS Q 840	811MB		\$199 ⁹⁵	\$299 ⁹⁵
Quantum 840 Trailblazer				
APS I 1080	1034MB		239 ⁹⁵	339 ⁹⁵
IBM DPES 31080				
APS Q 1080	1042MB	MacWEEK	269 ⁹⁵	349 ⁹⁵
Quantum 1080 Fireball				
APS Q 1280	1222MB		299 ⁹⁵	399 ⁹⁵
Quantum Fireball II 1280				
APS I 2160	2063MB		499 ⁹⁵	599 ⁹⁵
IBM Ultrastar ES				
APS MS 2000	2000MB		549 ⁹⁵	649 ⁹⁵
Micropolis 4421				
APS Q 2210	2100MB		629 ⁹⁵	729 ⁹⁵
Quantum Capella VP32210				
APS ST 4200	4094MB		899 ⁹⁵	999 ⁹⁵
Seagate ST 15230N				

APS I 1080

- ✓ Over 1GB capacity with Fast SCSI-2 interface
- ✓ IBM Magneto-Resistive (MR) head technology
- ✓ Enhanced power management
- ✓ 3-year warranty

\$239⁹⁵

Internal configuration

APS HIGH-PERFORMANCE DRIVES

Model	Capacity	Awards	Internal	SR2000
APS MS 2.0	1955MB		\$599 ⁹⁵	\$699 ⁹⁵
Micropolis 4221				
Fast/Wide or AV versions are available for an additional \$100.00				
APS Q 2.0	2050MB		799 ⁹⁵	899 ⁹⁵
Quantum Atlas XP32150				
Fast/Wide version is available for an additional \$100.00				
APS ST 2.0	2047MB		799 ⁹⁵	899 ⁹⁵
Seagate ST 32550N Barracuda				
APS MS 4.0	4064MB		999 ⁹⁵	1099 ⁹⁵
Micropolis 3243				
Fast/Wide or AV versions are available for an additional \$100.00				
APS ST 4.0	4094MB		1199 ⁹⁵	1299 ⁹⁵
Seagate ST 15150N				
APS Q 4.0	4101MB	MacWEEK	1199 ⁹⁵	1299 ⁹⁵
Quantum Atlas XP34300				
Fast/Wide version is available for an additional \$100.00				

- 30-day money-back guarantee on all APS brand products. Your risk is the cost of shipping.
- Drive-for-Drive Repair or Replacement Warranty. The warranty length is denoted by the superscripted number next to each drive model. APS will, at its discretion, replace or repair products found to be defective according to the terms of the product's warranty.
- Refused orders subject to 20% restocking fee.
- Listed capacities are formatted.
- Actual data compression and tape capacity vary greatly depending on the type of data recorded, other system parameters and environment.
- Prices and specifications are subject to change without notice.
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SCSI POWERBOOK DRIVES

Model	Capacity/Features	Drive Type	Internal
APS I 810	810MB		\$499 ⁹⁵
IBM Travelstar XP	4900 rpm	Fast SCSI-2	
APS I 1.2	1215MB		699 ⁹⁵
IBM Travelstar XP	4900 rpm	Fast SCSI-2	

IDE POWERBOOK DRIVES

Model	Capacity/Features	Drive Type	Internal
APS Q 810	810MB		\$399 ⁹⁵
Quantum Europa	3800 rpm	Fast ATA2	
APS PB 170	170MB		399 ⁹⁵
Avatar mechanism	Each cart 49" Removable cartridge		
APS Q 1.08	1037MB		499 ⁹⁵
Quantum Europa	3800 rpm	Fast ATA2	

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- ✓ Includes the latest Retrospect backup software — Free

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APS DAT

- ✓ The value leader in DAT backup
- ✓ Twice the speed of standard DAT — up to 19MB per minute
- ✓ Includes the latest 3.0 Retrospect backup software — Free
- ✓ 2GB native capacity on 90m DAT tapes — more with software data compression

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Your best value in DAT technology is the new APS DAT. It can pack up to 2GB of uncompressed data on a 90m DAT tape at a fast 19MB per minute — that's twice as fast as a standard DAT drive. It is especially well-suited to digital video and multimedia backups that don't require hardware data compression, as well as any situation where backup speed and capacity are a must.

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APS TAPE DRIVES

Model	Capacity	Awards	Internal	SR2000
APS HyperQIC QIC 3080 Mechanism	2GB	LABS ***** MacWEEK	N/A	\$499 ⁹⁵
APS DAT DDS-1 Non-Compression Mechanism	2GB			\$649 ⁹⁵ 699 ⁹⁵
APS HyperDAT DDS-2 Compression Mechanism	8GB			849 ⁹⁵ 899 ⁹⁵
APS HyperDAT Pro DDS-2 High Speed Mechanism	8GB			1049 ⁹⁵ 1099 ⁹⁵
APS DAT Loader600 Ideal for unattended large network backups	48GB		N/A	2499 ⁹⁵
APS DLT30 Digital Linear Tape Mechanism	30GB	MacWEEK ***** USA FINALIST	N/A	4499 ⁹⁵
APS DLT40 Digital Linear Tape Mechanism	40GB		N/A	5999 ⁹⁵
APS DLT4500 Loader Digital Linear Tape Mechanism	200GB		N/A	9999 ⁹⁵
APS DLT4700 Loader Digital Linear Tape Mechanism	280GB		N/A	11499 ⁹⁵

APS MO DRIVES

Model	Awards	SR2000
APS 230MB MO	LABS *****	\$399 ⁹⁵
APS 1.3GB MO 4MB Cache		1699 ⁹⁵
OPTICAL JUKEBOX Up to 26GB of reliable MO storage		9999 ⁹⁵

APS SYQUEST DRIVES

Model	Capacity	Awards	Internal	SR2000
EZ135	135MB		N/A	\$229 ⁹⁵
APS SQ 5200	194MB	LABS ***** MacWEEK		\$339 389 ⁹⁵
APS SQ 3270	255MB	LABS ***** MacWEEK	N/A	349 ⁹⁵

APS CD-ROM DRIVES

Model	Awards	Internal	SR2000
APS T 3701 6.7X-speed CD-ROM		\$399 ⁹⁵	\$449 ⁹⁵
APS PD4 Optical storage with 4X CD-ROM in one device	N/A		599 ⁹⁵
APS CD-R Recordable CD-ROM		N/A	999 ⁹⁵

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Internal configuration



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730MB Lightning	C109 1154/C109 1102	\$185/\$245
850MB TrailBlazer	C109 1206/C109 1207	\$199/\$259
1080MB Fireball	C109 1202/C109 1203	\$259/\$319
2200MB Capella	C109 1213/C109 1212	\$669/\$729
4300MB Grand Prix	C109 1159/C109 1108	\$999/\$1059
4300MB Atlas	C109 1122/C109 1121	\$1139/\$1199

Seagate

	Internal/External	Internal/External
2.4GB Hawk 2 LP ST32430N	C109 2211/C109 2112	\$739/\$799
4.3GB Hawk 4 ST15230N	C109 2212/C109 2113	\$999/\$1059
2.5GB Barracuda 2 LP ST32550N	C109 2203/C109 2109	\$889/\$949
4.3GB Barracuda 4 ST15150N	C109 2207/C109 2106	\$1259/\$1319
5.25" Full Height		
9.1GB Elite-9 ST410800N	S020 1014/C109 2110	\$2199/\$2299

CLUBMAC 2.5" HARD DRIVES

Quantum

	Internal/External	Internal/External
341MB Daytona	Q030 1041/C109 1119	\$179/\$299
514MB Daytona	Q030 1002/C109 1109	\$219/\$339
810MB Europa IDE	C109 1022	\$429 Internal
1080MB Europa IDE	C109 1023	\$475 Internal

CLUBMAC FAST AND WIDE DRIVES

Seagate

	Internal/External	Internal/External
2.1GB Barracuda 2LP ST32150W	C109 2214/C109 2215	\$959/\$1059
4.3GB Barracuda 4 ST15150W	C109 2206/C109 2208	\$1319/\$1419
9.1GB Elite 9 ST410800W	C109 2220/C109 2222	\$2379/\$2499

Quantum

	Internal/External	Internal/External
2.2GB Capella VP322105W	C109 2219/C109 2217	\$699/\$799
4.3GB Grand Prix XP343015W	C109 2216/C109 221	\$1029/\$1129

FAST AND WIDE SCSI CONTROLLERS

Adaptec

A024 1006	PowerDomain AHA 2940W SCSI Accelerator	\$299
A029 1001	Adaptec Remus 1.3 (Raid Levels 1, 4, 5)	\$439

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F094 1033	SCSI JackHammer PCI	\$389
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QLogic

Q010 1008	FastSCSI MAC PCI-N Fast SCSI-2 (10 MB/sec) connectivity	\$229
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Q010 1010	FastSCSI MAC PCI-D Fast/Wide SCSI requiring longer I/O cables	\$449

CD-ROM READERS

NEC

	Access Time	Trans Rate
N024 1062	MultiSpin 6Xc CD-ROM Reader	150ms 900k/sec \$479
N024 1070	MultiSpin 4Xc 7 Disc Changer	350ms 600k/sec \$339
N024 1011	MultiSpin 3Xp plus CD-ROM Reader	240ms 500k/sec \$379

ClubMac

	Access Time	Trans Rate
C109 9700	ClubMac 2X 7 Disc CD-ROM Changer	350ms 300k/sec \$149
C109 9555	ClubMac Six-Speed CD-ROM Drive	145ms 900k/sec \$369
C109 9546	ClubMac Quad-Speed CD-ROM Drive	140ms 600k/sec \$199
C109 9550	ClubMac Dual-Speed CD-ROM Drive	350ms 300k/sec \$88 ⁸⁸

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S198 2001	SyQuest EZ135 135MB 3.5" Removable	\$234 ⁹⁵

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	Media	Qty 1	Qty 10	Qty 20
S198 1010	44MB	\$42ea	\$41ea	\$40ea
S198 1011	88MB	\$47ea	\$46ea	\$45ea
S198 1012	200MB	\$75ea	\$73ea	\$71ea
S198 1013	105MB	\$35ea	\$34 ⁵⁰ ea	\$34ea
S198 1014	270MB	\$60ea	\$59ea	\$58ea
S198 2010	EZ135MB	\$23ea	\$22 ⁵⁰ ea	\$22ea

iomega.

1044 1010	Zip drive with One 100MB cartridge	\$199 ⁹⁹
1040 1006	Zip Cartridge (100MB)	\$19 ⁹⁹
1040 1011	Zip Cartridge (3 pack)	\$49 ⁹⁵
1040 1010	Zip Cartridge (10 pack)	\$149 ⁹⁵

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C109 2042	ClubMac 2-4GB SCSI MiniCartridge Drive	\$499
C109 5039	ClubMac 2.0GB ThunderDAT Drive	\$749
C109 5000	ClubMac 4-8GB DDS-2 DAT Drive	\$899
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V010 1021	5.25" 1.2GB 1024 Bytes/Sector Optical Cartridge	\$59

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Optical Storage Solutions

T140 1001	TORAY PhaseWriter DUAL™ PD	\$649
T140 2001	TORAY PDM-650 Media (ZCAV 650MB)	\$59

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Y010 1002	Yamaha 4X CD Recorder w/Toast CD Mastering software	\$2799
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P074 1001	RCD-1000 Recordable CD System w/Toast CD	\$1429

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N026 1031	NEC 15" MultiSync XV15+	\$469
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N026 1009	NEC 17" MultiSync XP17	\$1049
N026 1010	NEC 21" MultiSync XE21	\$1779
N026 1011	NEC 21" MultiSync XP21	\$2159

SONY

S106 1021	Sony Multiscan Trinitron 15SX-1	\$460
S106 1017	Sony Multiscan Trinitron 15SF-2	\$519
S106 1018	Sony Multiscan Trinitron 17SF-2	\$915
S106 1019	Sony Multiscan Trinitron 17SF-2T	\$1099
S106 1020	Sony Multiscan Trinitron 20SF-2	\$1855

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P026 1003	Portrait/Pivot 1700 .26 Dot Pitch	\$1049
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M156 1004	Mag 15" Technitron DX15T Trinitron	\$459
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H047 1039	HP DeskWriter 600 InkJet Printer	\$299
H047 1033	HP DeskWriter 660C Inkjet Printer	\$399
H047 1041	HP DeskJet 850C InkJet Printer	\$515
H047 1042	HP DeskJet 1600CM/PS PostScript Printer	\$1985
H047 1047	HP DeskJet 340 InkJet Printer	\$299
H047 1048	HP Mac Adapter for DeskJet 340 InkJet Printer	\$29.95

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E047 1018	Epson Stylus Color II	\$449
E047 1019	Epson Stylus Color Pro	\$599
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NEC

N027 1001	NEC SilentWriter Model 640	\$399
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AGFA

A055 1011	Agfa StudioScan IISI	\$939
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hp

H045 1013	HP ScanJet 4s Personal Scanner	\$299
H045 1009	HP ScanJet 4c Color/GS Scanner	\$949

MICROTEK

M150 1006	Microtek Scanmaker III	\$1989
M150 1026	Microtek Scanmaker E3	\$399

UMAX

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U010 1038	Umax Vista-S8 Pro	\$769
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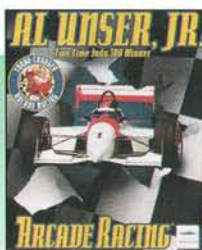
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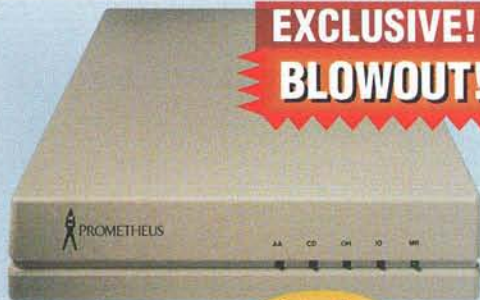
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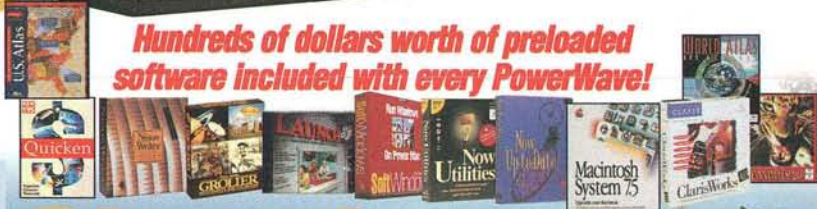
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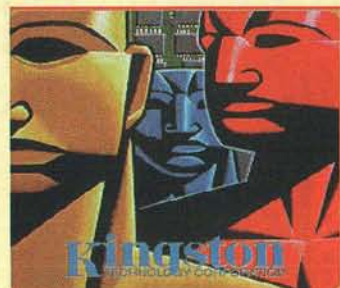
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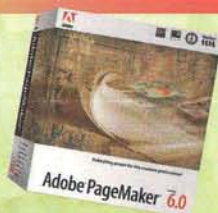
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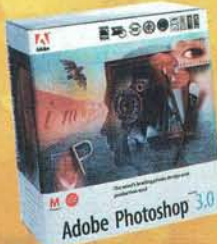
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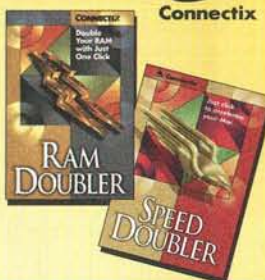
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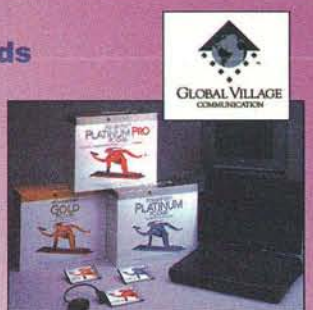
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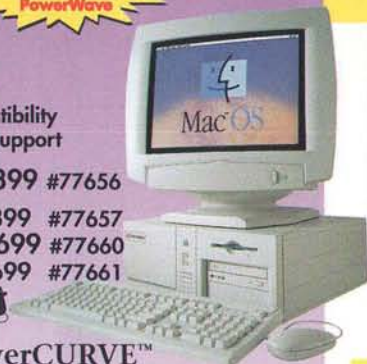
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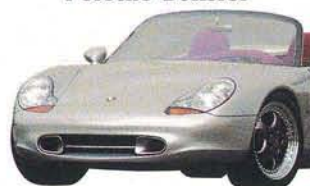
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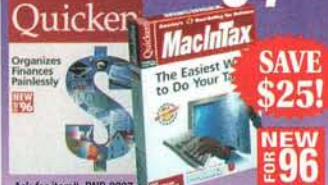
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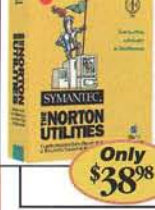
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89942	Delits Power 3.5" MD 230MB	\$579.98
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89936	Performant 4x Multimedia Kit	\$298.98

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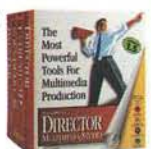
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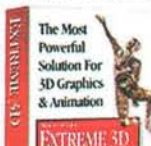
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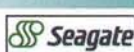
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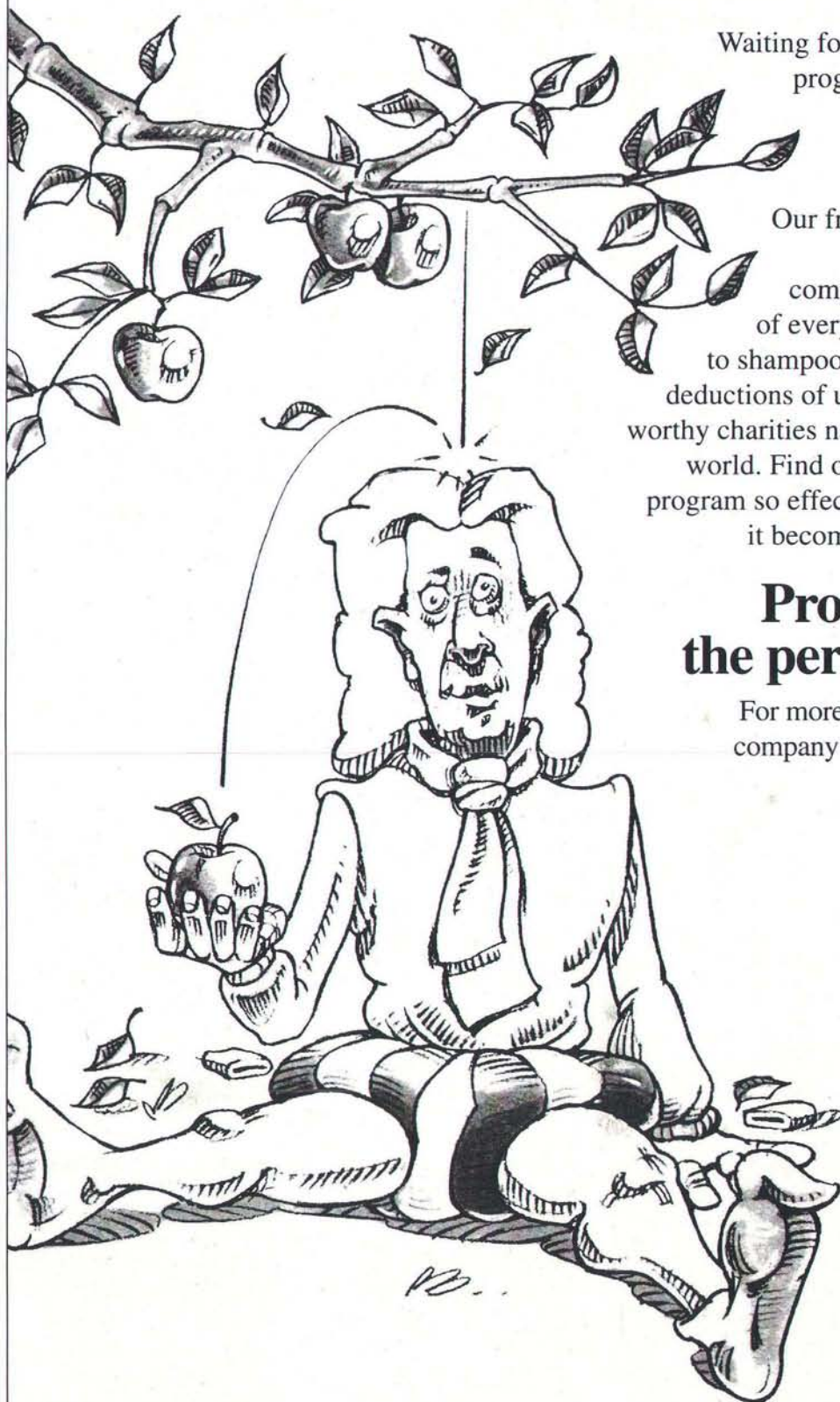
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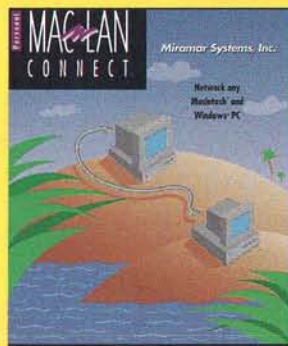
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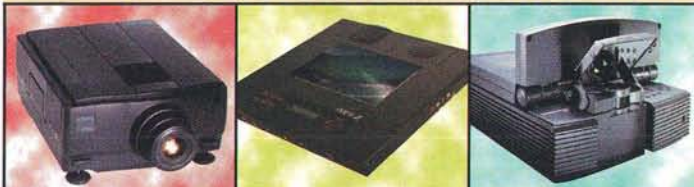
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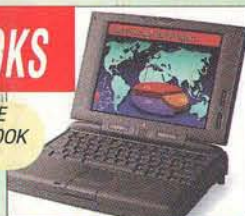
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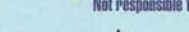
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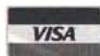
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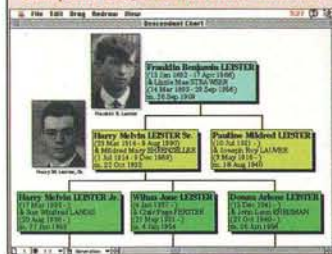
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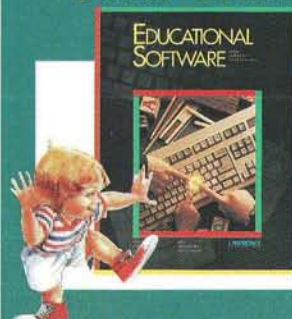
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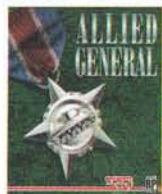
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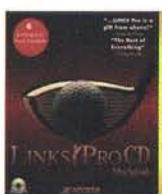
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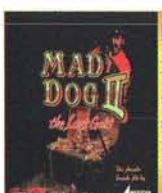
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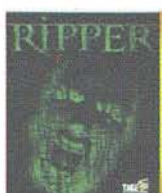
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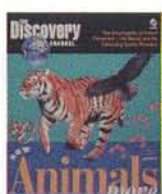
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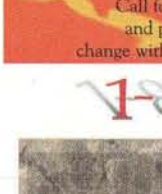
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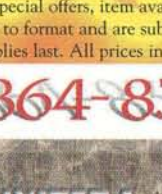
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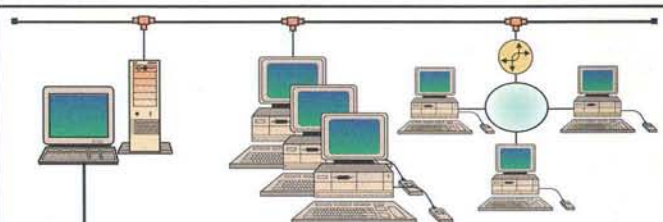
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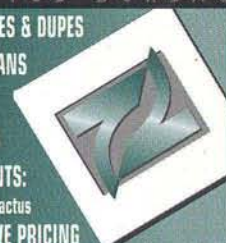
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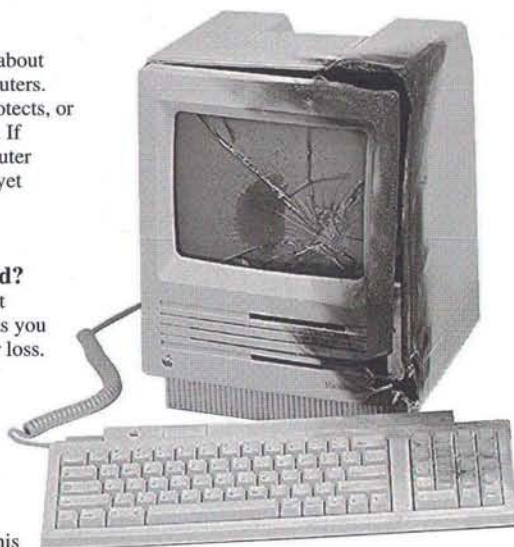
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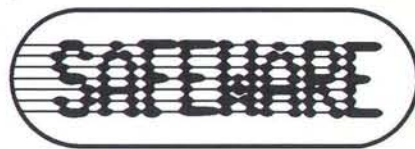
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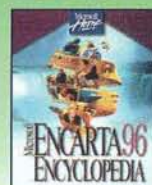
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MACWORLD April 1996 251

One-Mississippi, Two-Mississippi . . .

WHY DO MACS TAKE SO LONG TO GET STARTED?

ONE OF THE SACRED precepts of personal computerdom is that over a period of years, or sometimes even months, machines get cheaper, more powerful, and best of all, faster. When journalists, technologists, or flacks want to illustrate how impressive this is, they usually revert to some variation of the following analogy: "If cars followed the same price/performance curve as computers, the Rolls-Royce that cost \$100,000 in 1970 would now cost 80 cents, would get 1000 miles to the gallon, and would travel at six times the speed of sound." The mind reels—what if you were tailgated by that guy? No one would blame you for dismissing this whole business as some high-tech fairy tale. Yet there's proof that Moore's Law—the equation that says every 18 months chips get twice as powerful and cost half as much—truly delivers better computers at lower prices, year after year. The same \$2500 that bought the original Macintosh in 1984 (with 128K of RAM and the Motorola 68000 processor) now buys a color Performa (with 8MB of RAM, a heavy-duty 601 RISC chip, and a quad-speed CD-ROM drive).

I've had a lot of time to think about this lately, because I've been testing a fresh-out-of-the-factory PowerBook 5300c. Apparently, some of these units—mine included—had some sort of gremlin in the system software that made for some strange behavior. The first sign of trouble came at start-up. After depressing the power button, I and others similarly afflicted experienced a more-than-generous interval before the machine was ready for work. How much time? Over five minutes, now that you ask. This was ample time to contemplate not only issues in technology, but diverse subjects like the national budget, the odd yet welcome Jane Austen revival, and the simmering

debate as to whether the new millennium will truly begin on the first day of the year 2000 or as some literal-minded types insist, on the same day a year thereafter.

Now, I am informed by an Apple spokesperson that this long start-up process is not normal; something was awry. And indeed, sometime after I returned the unit, Apple announced a fix that presumably cut the launch time. Still, just last summer I tested out a Power Mac 9500, the mightiest unit Apple has offered to date, and though I never took a stopwatch to it, my nonscientific verbal countdown (one-Mississippi, two-Mississippi . . .) went well past the two-minute mark between turn-on and turned on. And the Macintosh I use most, my trusty Power-



Book 180, routinely takes over a minute.

To a Macintosh veteran like myself, this has a profound and disturbing significance. I remember the criticism leveled at the original Macintosh on its introduction 12 years ago. Not the least of its perceived flaws was a lackadaisical quality that manifested most glaringly on start-up. Unlike the other computers of the time—the IBM PC and the Mac's older cousin, the Apple II+—the Macintosh did not spring to attention immediately, but engaged in what seemed an interminable conversation between the internal and external floppy disk drives before the

folders finally appeared on screen and you were finally ready for work. Apologists looked on the bright side, suggesting that this break was a perfect time to fix yourself a cup of coffee. We pioneers understood: the Mac was hardworking but underpowered.

And now, 12 years later, with a Mac several hundred times more powerful, on starting up the machine we still have time to brew coffee. The faulty PowerBook even gave me time to grow coffee beans. So much for the Rolls-Royce that outspeeds the space shuttle.

The designers of today's computers, particularly the geniuses at Apple's R&D division at One Infinite Loop, are great at making machines more powerful, but severely lacking in clues as to how to make that power work for us. (Incidentally, this problem is no longer unique to Macintoshes—start-up on a Windows 95 machine also allows ample time to watch paint dry.) I'm sure there are solid technical explanations for the long boot-up period—after all, the software is much more complicated than it was in 1984, and the Mac performs so many more tasks. And this problem does not necessarily extend to everything: many tasks—opening files, for instance—do take much less time than in those early days. Maybe that's why it's so infuriating to confront the mini-eternity of waiting when you start the Mac.

So if any of you designer types are reading this, let me slip you some advice: we don't want computers that *can* go faster—we want computers that *do* go faster. From the very start. As any runner will tell you, the most important part of the race happens at the starting gate. ■

Macworld contributing editor STEVEN LEVY is a technology columnist for *Newsweek*. He is the author of several books on computer technology, including *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994).

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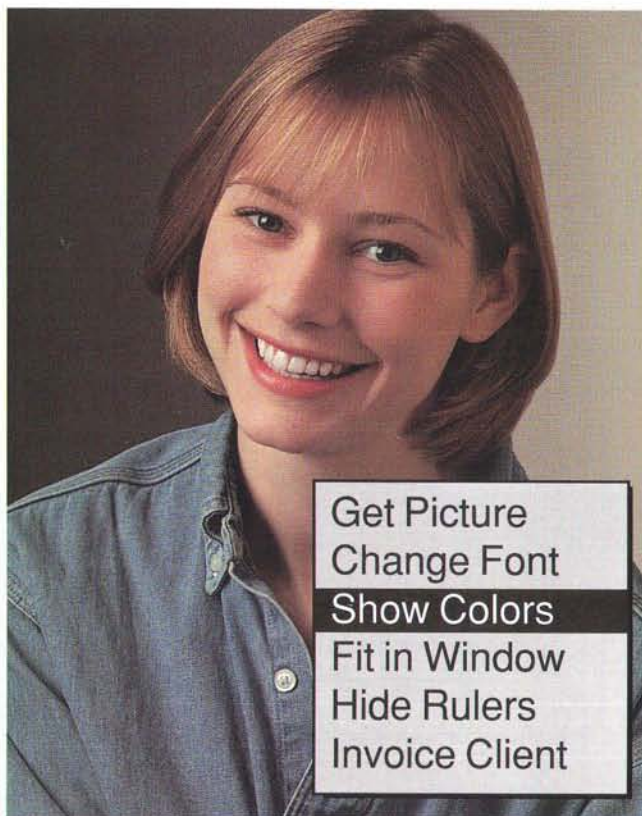
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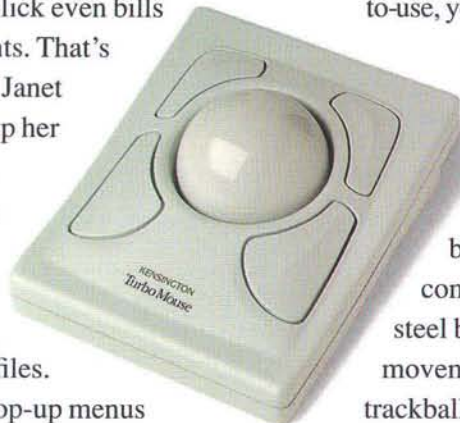
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